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Streptococcus Infections of Animals and Their Treatment*

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It is just over 50 years since streptococci were first recognised as associated with disease in animals. Nocard and Mollereau in 1887 described the streptococcus now universally agreed to be the most common cause of bovine mastitis and, in the following year, 1888, Schütz described the strangles streptococcus. Since that time, streptococci have been isolated from various other pathogenic conditions in animals and it will be generally agreed that the streptococci are of considerable importance in veterinary medicine. Streptococci are also, of course, responsible for a large number of disease processes in human beings, many of which are of an acute type.

The streptoccocci concerned in these various diseases are not all of the same kind. They can be differentiated in various ways: some are large and habitually produce long chains, others are small and occur chiefly in diplococcal forms or in chains of three or four cocci. Whilst, however, morphology is of some value when examining strains from a limited and well-known environment, *e.g.*, the udder, it is of little value for general taxonomic purposes.

Some streptococci have the property of lysing red blood cells in suspension or when incorporated in culture media such as the ordinary agar used for growing them. In the latter case, smaller or larger clear zones of haemolysis are produced around the growing colony; such strains are called beta-haemolytic or often simply haemolytic. Others produce a greenish discoloration of the red cells immediately around a colony with a zone of clearing outside this greenish zone. These strains are termed alpha-haemolytic or sometimes "viridans" or "green" streptococci. Yet others produce no observable effect and are called non-haemolytic (sometimes gamma). The properties of a strain in respect of haemolysis are of considerable value for purposes of differentiation and also, in the case of haemolytic streptococci, give rise to such a typical colonial appearance as to make their recognition in a blood plate culture tolerably easy, even if other organisms are present.

The fermentative or enzymic properties of a strain are also of some importance for purposes of differentiation. One species will regularly ferment one series of substances; another, a different series. The substances used include various sugars (*e.g.*, glucose, lactose, trehalose), certain alcohols (*e.g.*, mannitol, sorbitol) and glucosides (*e.g.*, inulin). Tubes containing small quantities of one or other of these substances are inoculated with the streptococcus under test and incubated for a few days to see whether the test substance has been fermented and acid produced. Another test of some value is the ability of certain streptococci, *e.g.*, those from the ordinary chronic bovine mastitis, to split sodium hippurate into benzoic acid and glycocol. Another is based on the fact that certain streptococci will, in a given medium, produce a much greater degree of acid than others, that is to say, the final or limiting hydrogen ion concentration is different. Yet another test is to see whether a strain will dissolve human fibrin or not.

Finally, serological or antigenic characters have in recent years assumed more and more importance as a means of classification, especially amongst haemolytic streptococci. It has been shown, for example, that streptococci can thus be divided into a number of broad groups which are related to their common habitat. Nearly all of the streptococci which are pathogenic to human beings fall into one group (Group A); the streptococci from the common chronic bovine mastitis form another group (Group B); all equine strains fall into a third group (Group C), whilst most strains from dogs fall into a fourth group (Group G). There are other groups which have been labelled E to K containing streptococci which have been isolated from man or animals but which have rarely been shown to be pathogenic.

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Several of these groups have been shown to contain a number of serological types.

The fact that streptococci can be differentiated in these various ways has resulted in one and the same streptococcus being given, on various occasions or by various workers, diverse labels; in earlier days, a name was usually given, in more recent times a letter or number. These designations are well enough known to those who are dealing every day with the genus streptococcus, but are apt to be confusing to others. I have, therefore, prepared a table in which are shown side by side the broad serological groups of streptococci, the groupings peculiar to bovine mastitis, the more important specific names, if any, and the animal species and disease process in which each is commonly found. It has not been possible to be entirely accurate with regard to minor details but the table will, I hope, show clearly the various human or animal disease processes in which each streptococcus is commonly concerned, and the relation between the various designations more commonly employed. Most of the streptococci listed are haemolytic. Notable exceptions are the streptococci associated with the various forms of bovine mastitis, which may be beta-haemolytic, alpha-haemolytic or non-haemolytic. In but few other cases have non-haemolytic streptococci been shown to be pathogenic.

It will be seen that certain serological groups are, in the main, confined to one disease process or one animal species, and *vice versa*, that

The Group Designation or Names commonly used for Pathogenic Streptococci, the Species Affected and Diseases or Infections Caused.

Groups.		Names if any	Species, and diseases or infections caused.			
Serological Group classification of haemolytic streptococci.*	Groups of bovine mastitis streptococci †		Humans.	Bovines.	Equines.	Canines.
A	...	*Str. pyogenes*	Scarlatina Puerperal fever. Erysipelas, etc. Normal nose and throat.	Occasional Mastitis	—	One infection reported.
B	I	*Str. agalactiae.* (*Str. mastiditis*).	Some vaginal and throat infections, rarely pathogenic.	Chronic contagious mastitis.	—	—
C (sub-Gp.a	...	*Str. equi.*	—	—	Strangles.	—
C (sub-Gp.b	...	...	Some infections.	—	—	Some infections.
C (sub-Gp.c	S 21 series.	*Str. pyogenes equi.*	—	Some mastitis (acute, sporadic)	Metritis, wound infections, pneumonia	
D	...	...	Few infections.	(Milk and cheese)	—	—
E	...	...	—	(Milk)	—	—
F	...	...	Few infections.	? Few infections.	—	—
G	...	...	Few infections.	? Few infections.	—	Fever, adenitis, septicaemia—genital troubles, sterility.
H	...	...	Few infections.	—	—	—
K	...	...	Few infections.	—	—	—
...	II	*Str. dysgalactiae.*	—	Acute mastitis (sporadic)	—	—
...	III	*Str. uberis.*	—	Acute or sub-acute mastitis (sporadic).	—	—

Notes. * Letters refer to the broad groups into which haemolytic streptococci have been divided (Lancefield and Hare, R.)
† Refers to the groups into which bovine mastitis streptococci have been divided (Minett, Stableforth and Edwards).

in any one disease process the streptococci are usually of the same group. This at once suggests that some of these groups, at any rate, have their natural habitat in a given species. More information is required regarding others. There are, of course, exceptions and overlappings, but in some cases it is known that these are due to fortuitous infection from the common habitat. I need only cite, for example, the finding of Group A streptococci in the cow's udder. This is rare and its occurrence is due to infection from a human source. Such an occurrence brings out the great value of being able to classify streptococci accurately. To follow further the case cited, it was recently shown in an epidemic of sore throat in human beings that the streptococci from the milker's throat, the cow's udder and from a number of the patients were not only of the same group (Group A), but were of exactly the same serological type. Unassailable evidence of the association of a chance infection of the cow's udder and the epidemic was thus collected. To take another example, the finding that in a self-contained herd all cases of streptococcus mastitis infection are usually of exactly the same serological type has given valuable confirmatory evidence that one cow is infected from another.

Diseases associated with Streptococci

Whilst making no attempt here to deal with the clinical features of the various animal diseases associated with streptococci, it will be useful to survey them briefly and to note the nature of the streptococcus concerned in each.

Bovine Conditions.

The only important streptococcus disease of bovines is mastitis. This is, however, widespread and causes great loss yearly. It is, without question, the most important streptococcus disease of animals. The first point which stands out is that bovine mastitis, as reference to the table will show, may be caused by several groups or species of streptococci. The term "mastitis" is, in fact, a composite term which includes what are in reality several different diseases. It is important to recognise this because the characters of the infection, and therefore the appropriate corrective measures, are diverse.

Thus, the common, chronic contagious mastitis of the milking cow is caused by *Str. agalactiae*. This organism corresponds with Group B of the broad group serological classification already referred to. It has also been called *Str. mastiditis* and is the organism referred to by Minett, Stableforth and Edwards in their earlier papers as "mastitis streptococcus Group I." *Str. agalactiae* mastitis is widespread, insidious in onset and marked by a large proportion of latent infections which may not be accompanied by clinical signs, but which may persist for years and constitute a constant source of danger because other cows may be infected from them during the operation of milking.

Mastitis may also be caused by other streptococci, *e.g.* (see table) those referred to by Minett, Stableforth and Edwards as "mastitis streptococcus Group II or Group III" respectively to distinguish them from *Str. agalactiae* which was called "mastitis streptococcus Group I." These are the streptococci which were later called *Str. dysgalactiae* and *Str. uberis* respectively by the Austrian worker, Diernhofer. These streptococci cause mastitis which is sporadic in occurrence, usually acute and attended by rapid resolution or loss of the quarter. They are relatively infrequent but may be a considerable source of trouble in certain herds. Cows do not as a rule remain infected after the acute phase of the attack is over.

As seen from the table, mastitis may also be caused by haemolytic streptococci of Groups A or C.

Mastitis caused by Group C is also sporadic in occurrence and relatively uncommon though several cases may occur at one time in the same herd. It is acute and severe and generally results in prompt loss of the quarter. The streptococcus concerned is exactly similar to that which is frequently found in various equine conditions other than strangles and also occasionally in dogs. It belongs to the third sub-group of Group C.

Mastitis associated with Group A streptococci is rare but is important because Group A is the group mainly responsible for such human infections as scarlet fever and septic sore throat and mastitis due to it may therefore be the starting point of a serious epidemic. It is therefore important when an outbreak of sore throat or scarlet fever of such a nature as to suggest milk infection occurs (explosive nature, confined to one or two milk rounds, etc.) that the cows be at once examined. Infection of the milk supply may of course occur from direct human contamination, but this is not likely to be associated with a large outbreak since it has been shown that Group A streptococci will not multiply in fresh milk. Mastitis caused by Group A streptococci is usually acute. Infected quarters may, however, show few or no symptoms although excreting large numbers of streptococci.

Equine Conditions.

Strangles has been known for a very long time to be associated with haemolytic streptococci. There is also good evidence that haemolytic streptococci play a prominent part

in the aetiology of equine pneumonia. In more recent times it has been shown that streptococci may be the cause of abortion in mares, that they are frequently found in joint-ill lesions in foals and, more recently still, that they are commonly associated with chronic metritis in mares accompanied by failure to breed. Other sources from which I have isolated them in pure culture during the past two years include semen from a stallion, an infected castration wound, skin lesions, previously unopened poll-evil or fistulous withers, the mammary gland of mares, sinus infection, nasal catarrh and various wound infections.

The first point of interest is that all the streptococci from equines so far examined serologically have fallen into Group C. The second, that the streptococci isolated from equine conditions other than strangles have all proved to be exactly alike in biochemical characters, falling into the third sub-group of Group C; and the third point, that they are distinct from the strangles streptococcus which forms the first sub-group of Group C. It would be of interest to examine the character of streptococci associated with pneumonia following strangles and to see to which sub-group they belonged.

Canine Conditions.

Haemolytic streptococci have recently been shown to be associated with a variety of conditions in dogs. As far as I am aware they were first reported by two American workers who isolated them from cases of tonsillitis and also from normal dogs. Shortly afterwards, Lancefield and Hare (R.) reported the isolation of haemolytic streptococci from a case of otitis-media in a dog. More recently, Hare (T.) has given us a valuable pioneer contribution on the clinical features of haemolytic streptococcus infections in the dog accompanied by serological details obtained by Fry. My observations during the past year or so agree with theirs. They have described, under the term "sterility syndrome," such conditions as anoestrus, failure to conceive, abortion and, in one or two cases, puerperal fever; under the term "adenitis syndrome," the condition marked by transient fever, nasal discharge and swelling of the submaxillary and upper cervical glands which may subside quickly or be followed by suppuration. The infection may also be associated with death in young puppies and occasionally, in Hare's experience, with septicaemia in the adult. Other conditions from which I have isolated haemolytic streptococci in pure culture are dermatitis, interdigital cysts (unopened and one of a particularly malignant type associated with much cellulitis and underrunning of the tissues), mastitis in the bitch associated with deaths of puppies, a wound which refused to heal, an eye lesion and a case of pneumonia. We have yet to learn the exact importance of the streptococci in all these conditions, but it is obvious that streptococci are associated with many conditions in dogs which cause a serious loss to their owners. We need yet to know more about the streptococcus itself. Does it produce a soluble toxin like Group A or is it like Groups B and C—incapable of producing one that is demonstrable? We need yet to know more regarding the general distribution of haemolytic streptococci in normal dogs, the regularity with which they can be isolated from a given subject, the proportion of infected dogs that show symptoms, and more about the course of the disease. Does it commence, let us say, with the fever, nasal catarrh and swelling of the glands? And are the other clinical conditions the end result of an earlier generalisation; or are they, as has been suggested by Hare, more properly classified as separate syndromes?

The most striking point regarding the serological characters of the strains is that in my collection, as in Hare's, the majority of the strains from dogs have proved to belong to one group—Group G; a smaller number have fallen into Group C, whilst one or two do not fall into A, B, C, or G. So far, there appears to be no correlation between the group and the clinical lesion. I have, as yet, not met with any Group A strains (Hare records one), but have met with one Group B.

Streptococcus Infection in Other Species

Whilst we know that streptococci may be associated with pathogenic conditions in other species of domestic animals, we have as yet little information regarding their incidence or the nature of the streptococci.

A few of the cases that have come to my notice may be mentioned. In one, a streptococcus isolated from a dead kitten and from the mother's milk both proved to belong to Group G. In another, streptococci from a sheep's udder proved to be Group C, whilst another strain from a case of joint-ill in a lamb also fell into Group C.

Outbreaks of disease in pigs, due to streptococci, have also been described in France but no serological or other details are given.

Control and Treatment of Streptococcus Diseases

Apart from symptomatic and palliative treatment, with which I do not propose to deal, the methods available fall under three headings, *viz.*, prevention by segregation of the infected, vaccination and chemotherapy.

Control by Segregation of the Infected.

The practicability of control by this method depends on the relative proportion of clinical cases and latent infections or carriers, the persistency of the carrier state and the ease and regularity with which it can be diagnosed. So far as we know, there is no allergic or serological method of diagnosis for any of the streptococcus infections of animals. The isolation of the streptococcus itself by cultural methods is therefore necessary.

Control by segregation has been shown to be a way of dealing with the common chronic mastitis of dairy cows (*Str. agalactiae* mastitis). It has been shown in this disease that the carrier state is generally persistent, that it is relatively easily diagnosed, that a considerable proportion of carriers later develop more obvious symptoms and, finally, that a herd can be freed by this means.

What is the position regarding the streptococcus infections of equines or dogs?

To take equine metritis and sterility for example, do we yet know enough regarding the incidence in normals and the persistency of infection? A great deal of further work seems to be required to find out (1) what proportion of individuals which breed normally are carriers, (2) whether they are persistent carriers and could be diagnosed by occasional examinations of all stock in a given stable, (3) whether carriers are more frequent in stables which have clinical cases than in those in which breeding proceeds normally, and (4) whether, by segregation (or appropriate treatment of the infected) further infections and clinical cases can be prevented.

With regard to canine infections, we have a little more information. Hare, for example, has shown that in five kennels an average of 40 per cent. of animals were carriers of haemolytic streptococci, and, from the fact that 14 out of the 15 strains which were examined serologically were alike (Group G), it may be assumed that the most of the 56 infections were the same. One examination only was, however made. Would the same proportion of infections have been found at a second examination, and would the same dogs have shown infection? Does the infection persist in a given dog? Can infection be diagnosed with regularity? Must a dog once found to be infected be always regarded as a dangerous source of infection to other dogs or may it lose its infection permanently? It would seem that on these and other epizootiological points we still need much information before control by segregation of carriers can be regarded as basically sound and indeed before the effect of any form of treatment can be assessed.

Vaccination.

Vaccines, both autogenous and others, have unfortunately proved disappointing in the treatment of streptococcus infections in general. They have been used widely in human infections and in animal infections such as bovine mastitis, strangles and joint-ill. Good and bad results have been reported but the evidence from controlled experiments supports the view that they are not of much service.

In the case of human infections caused by *Str. pyogenes* (Group A), which produce a soluble exotoxin, there is, it is true, clear evidence that an antitoxin may be of value in combating the action of that toxin, *e.g.*, the rash of scarlatina and symptoms due to a toxic action on kidneys and other organs, but there is not satisfactory evidence that it exerts a marked effect in other ways.

The animal streptococci so far examined do not, however, produce exotoxin so that treatment in this way is neither possible nor necessary. Ordinary antibacterial sera might conceivably exert some beneficial effect through the presence of antileucocidins, antihaemolysins, etc., but there is no evidence on which to base an opinion, and the preparations on the market are not standardised for any of these properties.

Chemotherapy.

Attempts to influence the course of streptococcus and other bacterial infections by the use of chemical bactericidal agents are not new. The older antiseptics, however, such as phenol, corrosive sublimate, etc., fell into disfavour long ago, because it was found that, when they were used locally at bactericidal concentrations, they were too irritant and interfered with the defence mechanisms of the body, whilst, when given by the mouth or parenterally, they produced general toxic effects at concentrations which were insufficient to exert a bactericidal action in the blood or tissues.

New interest was awakened in the subject by the development of certain complex organic compounds in the treatment of protozoan diseases. In due course, it was found that, amongst others, certain of the acridine dyes had a marked bactericidal action, particularly on streptococci, and they have come into much favour in the local treatment of various streptococcus infections. These substances, however, are only effective when used locally.

The next striking advance was made in 1935 when Domagk discovered that a complex organic compound of another kind, prontosil, though inactive *in vitro*, would protect mice against an injection of streptococci far greater than that which was necessary to produce death in untreated mice. Domagk's

finding has been amply confirmed by other workers on the human side with the various types of Group A streptococci, and evidence was soon forthcoming to show that prontosil, and later a simpler compound—sulphanilamide—was effective in the treatment of various natural infections of humans caused by Group A streptococci. As a result, a great stimulus was given to work of this nature and numerous other organic compounds have been, and are being, prepared in the hope of finding agents which are even less toxic but more bactericidal as regards both streptococci and other organisms.

Little is yet known regarding the efficacy of substances of the prontosil-sulphanilamide type in streptococcus diseases of animals.

Local chemotherapeutic treatment is carried out by bringing some agent which has a powerful killing effect on streptococci, but which is relatively non-irritant at a working concentration, into intimate contact with the streptococci. The acridine dyes—rivanol, entozon, and the flavines — acriflavine, euflavine and proflavine—have so far proved the most useful. The exact concentrations of each to be used have to be decided, within limits, according to the nature of the condition to be treated. The use of too high concentrations is, however, to be avoided, not only because they may be directly irritant, but because they may interfere with the normal defence mechanisms of the body. Whilst much of the effectiveness of these substances is due to direct bactericidal action, it is probable that their effects are also partly due to their action in reducing the virulence or resistance of the streptococci so that they are more easily dealt with by leucocytes.

In bovine mastitis, due to *Str. agalactiae*, it has been shown that either acriflavine, 1:10,000, or entozon, 1:1,250, will sterilise some 60 to 80 per cent. of infections which are not of too long standing. Acriflavine is to be preferred because it is somewhat less irritant and at the same time equally or more effective. Two treatments are to be recommended at an interval of about a week. In milking cows the infusion should be left in only for four to five minutes, but in dry cows it may be left in for 18 to 24 hours. The two methods appear equally effective. Old standing cases are more difficult to deal with and, in our experience only some 30 per cent. of quarters can be cured in this way. Details of the method and of our results have recently been published. In severe old standing cases, it is possible that somewhat higher concentrations might give better results.

Another condition which would appear suitable for lavage with acriflavine or entozon is metritis; in particular, streptococcus metritis of mares. The use of entozon or one of the flavines for the irrigation of wounds is, of course, widely practised.

Chemotherapy by the Oral or Parenteral Routes.—In view of the strikingly encouraging results obtained by the use of prontosil, sulphanilamide and certain other allied substances in infections of humans due to Group A streptococci, it is natural that their efficacy in animal diseases due to streptococci of other Groups should be tested, both in the field and experimentally. Some of the more common animal streptococcus infections are, it is true, of a less acute type than those infections of humans in which it has given such promising results, *e.g.*, puerperal fever, with its dangerous complication — septicaemia. Nevertheless, acute streptococcus infections of animals are not rare, whilst the more chronic infections are of such importance that a thorough trial in certain infections of animals seems merited.

In our work at the College, we chose sulphanilamide for test in the first place. It is this substance which is produced by the breakdown of prontosil in the body and to which most, if not all, of its action is due. It has also the advantage of being much less costly—an important factor in view of the large size of many of our patients.

Attempts were made firstly to find out by experiments in mice whether the groups of streptococci concerned in animal diseases are equally susceptible to sulphanilamide as are the streptococci belonging to Group A. The first experiments were made in mice because they can be used in numbers which are likely to give a statistically satisfactory answer. Unfortunately, it has not yet been possible to carry out mouse experiments with Group B streptococci, *i.e.*, those which cause the ordinary chronic bovine mastitis, because these are not naturally virulent from the mouse and all attempts to raise their virulence sufficiently have so far failed.

In infections with Group C streptococci, Mr. Hignett and I were, however, able last year to show that sulphanilamide *per os* would protect mice against 100 to 1,000 or more average lethal doses. The Group C streptococcus may, therefore, be regarded as susceptible and field trials as indicated in those diseases associated with it, *e.g.*, strangles, metritis of mares, certain cases of acute bovine mastitis and possibly joint-ill. No work has yet been carried out on Group G streptococci. Certain reports from clinicians suggest, however, that substances of the prontosil-sulphanilamide type may be effective in streptococcus diseases of dogs.

Sulphanilamide appears to be well tolerated by most of the domestic animals. We have, this year, endeavoured to find out the largest doses tolerated by horses, cows and dogs, and

the dosage, by various routes, single or repeated, required to get and maintain a useful concentration of sulphanilamide in blood and milk. It is not my purpose here to go into any detail in this matter but it may be said that the oral route of administration appears to be as satisfactory as any other (a useful concentration of sulphanilamide is present in blood within two to five hours), and that a dosage of 1 gm. per 10 lbs. body weight is well tolerated by horses, cows and dogs, even when administered over a long period. Much larger doses can be given on a single occasion without producing serious symptoms.

It is important that the bacteria concerned in any given condition which is to be treated should be identified whenever possible. If infections of various kinds are treated indiscriminately, sulphanilamide or prontosil, like any other remedy, may, without justification, get a bad name. Even in acute conditions, material for laboratory examination can usually be taken immediately before treatment. Similarly, attempts should be made to ascertain after treatment whether the causal organisms are still present or not. In bovine mastitis, equine metritis, certain chronic infections in dogs, for example, it is possible to examine material before and after treatment. In more acute conditions a gland puncture or blood examination might be made.

In conclusion, I would emphasise the value of co-operation between laboratory worker and clinician because it is in this way that we shall most quickly obtain satisfactory evidence of the usefulness of treatment and increase our knowledge of the streptococci concerned in animal disease and of their epizootiological characters.

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Discussion

Captain G. N. Bushman said that he was distressed to hear that Dr. Stableforth did not think much of these vaccines, because he had used them very largely and he had believed them to be of very considerable service. Unfortunately, in practice, one could not use other people's horses as controls, but as soon as that paper was published he should be able to do away with the routine that he had adopted with young horses travelling to London, that was to vaccinate them straight away. If he could say that Dr. Stableforth did not think it was useful he could leave a certain number of horses unvaccinated and he should do so to see what happened. The figures that he (Captain Bushman) had were possibly, in view of what Dr. Stableforth had said, due to a variation in type over a long period, but certainly before he started vaccinating—and he was talking of a stud of about 400 horses—he used to lose not less than 20 per cent. of horses from strangles, either by death or disability: that was going back to 1914 when they certainly did lose a tremendous number of horses. He supposed it was just after the War that they started vaccinating vigorously; everything was vaccinated and, quite frankly, he did not remember the last horse that he lost with strangles.

As regarded the use of those vaccines for pneumonia, he had not had a case of pneumonia in that stud (which had now, unfortunately, been decreased to 250 animals) for eight or nine years. He, too, had tried prontosil, but it was unfortunately difficult material for the practitioner to use. They were able to use 200 c.c. of a solution, and the makers suggested that they should not give it all in one dose, but he had not had time to split it into three doses and give it intravenously. He doubled the concentration and gave it subcutaneously during the course of the day. They had it tried on some six or eight horses, and he rather thought that the dilution was too great, because the results were, to his mind, somewhat disappointing: it dropped the temperature one degree straight away, but it did not do more—the animals had remained sick, and the use of this agent seemed to compare unfavourably with some other lines of treatment. He was told by Messrs. Bayer that they tried to produce the material in a gelatin capsule, so that it could be given by the mouth, which was certainly going to simplify matters very much indeed.

Captain Bushman said, in conclusion, that, as a treatment, he did not think that vaccination was of any great value; its real efficacy was as a preventive.

Mr. W. S. King observed that there was a haemolytic streptococcus occurring in horses which was not the strangles streptococcus and the extensive number of *post-mortem* examinations with which unfortunately he had had to deal over many years, coupled with the clinical manifestations observed in these cases and swabs taken, had led him to believe it began to operate primarily in the large colon. At every such *post-mortem* examination there was to be observed a gastro-enteritis in these septicaemic conditions, the lesions, in every instance, being older in the posterior part of the bowel and presenting a more acute appearance as they appeared in the small bowels and stomach. The lungs in every case showed marked changes as pneumonia was present in the great majority. He had, however, seen a few cases, where the animals died, in which he had found the lungs in the congestive stages. He might mention there that he had found that so far as pneumonia in the horse was concerned, for many years now it had been impossible to find it without enteritis in the London slaughterhouses—and a very careful watch has been kept. He was not challenging the fact, which he recognised, that this was not the only type of pneumonia met with in the horse, but he did say it was the only type which had reached the slaughterhouses. The spleen was always enlarged, petechial haemorrhages could be found, and there was cystitis and haematuria.

To make an accurate diagnosis in the early stages of these conditions was not a very easy matter as the symptoms might vary. He would like to mention there that enteritis could and commonly did exist in the horse without any clinical manifestations. As recently as a week ago they destroyed a horse involved in an accident and on *post-mortem* examination he showed a deep-seated inflammation of the bowels involving the muscular and submucous coats, yet he never showed any pain. He realised that this is quite contrary to what the text-books said, but if any person cared to take the trouble to make a complete investigation of this matter they

would find that what he had stated was true. It was quite usual to find an animal, when first taken ill, with a temperature 106°, very dull and disinclined to move, off feed with a pulse not very much disturbed. This state of affairs could continue up to, say, the fourth or fifth day, when the respirations became disturbed—varying to anything from 26 to 48, and the pulse at this period might be from 70 to 90. He had also seen the respiratory changes delayed as long as the ninth day.

Cases which followed the course he had observed frequently took to lying down, usually from the sixth day onwards (of course the time here might vary) in a dull pain. On the other hand, a case could be ushered in by colicy symptoms and an animal might go down from pain and be unable to rise again through complete loss of power—in fact, a total inability to move at all—and remain in this condition without even struggling, for several days; ultimately they destroyed some of these cases and swabs taken from the bowels and lungs showed haemolytic streptococci. He had had many such cases, but one occurring over two years ago, stood out in his mind and was worth recording as showing the difficulties in diagnosis.

A grey van gelding had a temperature of 106° F. for five days with the usual extreme dullness. He was sent by an insurance company to see this animal and on his second visit, which was the fifth day of the illness, he observed the respirations to be 38 and the pulse rate 84.

He reported that he considered the animal would die. The veterinary surgeon attending the case called in a consultant who advised the application of mustard to the sides, which—in the speaker's opinion—immediately resulted in the animal going on the floor and dying within 24 hours. The *post-mortem* examination on this animal revealed gastro-enteritis, pneumonia, enlarged spleen, petechial haemorrhages, etc. The veterinary surgeon who attended the case reported the animal as dying from azoturia and he based his opinion on the fact that the animal could not get up and the altered colour of the urine in the bladder. However, he (Mr. King) pointed out to him what was found on *post-mortem*—that the animal had eaten nothing for seven days and that the discoloration was due to haematuria.

As showing the difficulties encountered in diagnosis he would like to draw their attention to the fact that some little time ago he had a rather unusual case in a chestnut coaching horse, beginning with slight colicy pains with symptoms somewhat similar to those shown in animals with psammoma. The horse maintained a balance with his frontal bones pressed on the wall. He confessed that he was at a loss to make a diagnosis, and as the animal began to knock itself about, he advised destruction. The *post-mortem* examination—which was not made by him, but by one of his assistants—revealed gastro-enteritis, pneumonia, cystitis, haematuria, enlarged spleen, petechial haemorrhages, etc. He regretted that no swabs were taken in this case.

Quite recently he had a bay gelding showing symptoms similar to those in the previous case. He gave him prontosil intramuscularly twice daily for four days, when recovery took place. He had made application for the prontosil in powder form, for use as a bolus. Although it was usual for these cases to appear in single file, they could arrive in multiple numbers and only this year he had an outbreak with 15 animals attacked in one yard, as their worthy and popular Secretary could testify. During the last six weeks he had five cases—three with pneumonia and two with enteritis, and the usage of prontosil gave good results.

In conclusion, Mr. King observed that, as Dr. Stableforth had said, a great deal of work had yet to be done on this subject, particularly with a view to facilitating diagnosis, and to this end the closest collaboration between the practitioners and the laboratories was necessary.

Mr. A. B. MacIntyre said that he thought it was true that vaccines made in the ordinary way for prevention and cure of streptococcal infections were more or less useless. However, it had been shown in recent work that a good protective serum could be made in rabbits by giving repeated injections intravenously of haemolytic streptococci grown for three or four hours and killed by a heat of 56° C. for 15 minutes. This method preserved the capsule of the organism which was usually destroyed by ordinary methods of vaccine preparation. If a good serum could be made by this method it was possible that a vaccine prepared similarly might give good results when repeated injections were given intravenously.

As regards sulphanilamide, they had shown at Beckenham that this drug did seem to be of value particularly in secondary conditions in distemper due to haemolytic streptococci. The dose suitable seemed to be ½ gr. per kilo body weight divided into two doses daily. The drug might not reduce temperature altogether; in fact it might produce one. Treatment should be continued for about one week.

Lieut.-Colonel G. Rees-Mogg said that, as regards the streptococcus, he had had a lot of cases of strangles in horses during the 30 years he had been in the Army. In his experience he very seldom had a case of death from the disease: very occasionally an animal developed pneumonia and pleurisy and died, but they usually got well in from 10 to 21 days.

When a batch of remounts arrived over from Ireland they were put in a stable by themselves and within 48 hours one or two horses started running from the nose with or without a slight temperature and some with an abscess in the throat and the disease usually went through the whole lot. The after-results, of course, were disastrous, as so many horses became whistlers and roarers afterwards. He had tried vaccines in many forms as a preventative of strangles, but they were all quite useless.

As regards mastitis, this of course was a bugbear for all dairy herds, and usually one of the chief causes of the large wastage of cows. In some years, one met with a great deal of "summer" mastitis, when the flies are very prevalent, in calf heifers or in-calf cows which were dry. It was a most virulent form, and very often the animal was dead in two days. He had tried nearly everything as a curative for mastitis, and if the inflammation had not diminished after 48 hours with hot water fomentations and an application of antiphlogistine, not much good would be derived. The great thing was prevention by such means as keeping the cowhouse scrupulously clean, and milking the cows which had been affected with mastitis, last of all. He had tried treatment recommended to him by Mr. John Brown, of Invergordon, of injecting BIPP up into the teat canal, making sure that the cannulae for heifers were very small, other-

wise the lining might be injured, then sealing over the teats with collodion, and then smearing the udder with a coal tar preparation with a strong smell to keep the flies away. This was to be repeated every fortnight.

Last year he had had a lot of trouble with mastitis in sheep after lambing. Owing to the wet weather and many of his fields being flooded, he had to keep the ewes and lambs in the lambing-pen, which was overcrowded, for four or five weeks, and some of the ewes got a wound on the top of the teat, from the lamb sucking, and in consequence the ewes got mastitis in a very virulent form, the udder becoming very hard, and turning a bluish-black, and very often the ewe was dead within 48 hours. In the few cases in which a ewe survived, half the udder sloughed off. This year, owing to the perfect weather for lambing, the ewes and lambs were in the fields most of the time, and in consequence he did not have any cases.

Dr. Tom Hare observed that he was deeply interested in Mr. King's statement that the symptomatology of haemolytic streptococcus infection in horses was very variable. In thanking Dr. Stableforth for his admirable opening of the discussion, he would suggest that the essayist might have made Mr. King's statement one of the fundamental properties of the haemolytic streptococci in our animals. Certainly he (Dr. Hare) agreed with Mr. King that the variable symptomatology was characteristic of the infection in horses and in dogs.

Dr. Stableforth had endeavoured to demonstrate the correlation between the host and the group of streptococcus based on its serological properties; a correlation which was true only up to a certain point. For instance the G-streptococcus was the more common group in dogs, but he and Dr. Fry also found that the A, C, D and E groups produced the same clinical syndromes, and as far as he could judge, the same pathology.

Similarly it was possibly true to say that the majority of human infections were group A, but groups B, C, D, G and H, were also isolated from human cases of similar symptomatology and pathology (*vide*, Green, C. A., *B.M.J.* 1938. *i*. 1147). These facts gave rise to the interesting speculation—was there any chance that the dog was the source of infection in its owner or *vice versa*? He and Dr. Fry were studying this point; it was a difficult problem. For instance, they found that there was a slight difference between the dog "A" strains and the human "A" strains. Lancefield, in America, found that her results agreed more or less with theirs, but not exactly. He was not prepared to go so far as Dr. Stableforth in drawing hard and fast conclusions from the serological groupings; at the moment the meaning of the various serological groups was not apparent.

Under field conditions, it appeared that group G infection in dogs was directly transmissible to cats. He and Dr. Fry had found infection by G and C in cats from kennels in which the infected dogs and bitches lived; they had one isolated case in a fox. Also they had a few cases in pigs of both the A and C groups.

He did not think there could be much doubt that it was one of the most prevalent diseases of dogs with which they were dealing at the moment. He would not anticipate the paper they were giving to Congress, N.V.M.A., but he would like to mention one or two further points. They would remember that Mr. Henry Gray—and if there was one man worth listening to in the profession, it was Henry Gray—had said, despite all that Laidlaw, Dunkin and Dalling had recorded about the virus of canine distemper, it was evident that a dog might recover from distemper and yet get another attack. The results of his (Dr. Hare's) work went to show that the beta-haemolytic streptococcus infection could produce a disease clinically indistinguishable from distemper, and in this fact lay the probable explanation of Mr. Henry Gray's observations. In other words, many cases which had been regarded as distemper in the past had never had anything to do with the virus: they had been pure beta-haemolytic streptococcus cases. Furthermore, it was the probable explanation of the so-called distemper in dogs which had been vaccinated and protected by the Laidlaw-Dunkin method some time previously. He also thought this fact might relieve the tension that had been on their minds as to why immunised puppies had subsequently gone down with clinical distemper. It might be unnecessary to add that a dog adequately protected by the Laidlaw-Dunkin method against distemper was not protected against this beta-haemolytic streptococcus infection.

These B-haemolytic streptococci could be highly contagious. A dog contracted the infection at a show. Swabs were taken and the G-streptococcus isolated, ten days after its return from the show. Within 19 days of that dog's arrival back at the kennels, the infection began spreading to the other dogs and bitches: eventually some 150 of them became infected.

He would like Dr. Stableforth to give his observations of the "carrier" problem.

With reference to Dr. Stableforth's statements on vaccine therapy, surely he had overlooked the technique of using vaccines against the streptococcus as laid down by Sir Almroth Wright and Sir Frederick Andrews who taught some 30 years ago that vaccination against streptococcus was a matter of repeated dosage over definite periods. He (Dr. Hare) advised preventive vaccination for the control of bovine mastitis, of these dog infections and of equine strangles and that the course of autogenous vaccination must be repeated at intervals of three months. That, of course, was too expensive for the majority of farmers where mastitis was concerned, but in those herds in which they could get the owner to consent to have it done its use had been fully justified. The vaccine must be autogenous: it must be made from the strains of streptococci infecting the premises.

Prontosil was definitely effective as a curative in streptococcal septicaemia, *i.e.*, when the temperature rose above 104·5°, but its efficacy in non-septicaemic streptococcal infections was not very evident at the moment. However he hoped to deal with the chemotherapeutic problem in his forthcoming paper at the Glasgow Congress. Finally, they must remember that one could kill one's animal with an overdosage or incorrect administration of prontosil.

Mr. Galloway said he would like to ask Dr. Hare whether, in those cases in dogs which he had referred to as resembling clinical cases of distemper, he excluded the virus infection.

Dr. Hare replied that the answer was in the affirmative in cases received for *post-mortem* examination, this being determined by ferret inoculation; obviously he could not exclude the virus infection in cases diagnosed by swabs from the living animal.

Mr. Galloway observed that he believed it had

been suggested that although one could recover *Streptococcus equi* in strangles with extreme regularity, the primary cause might nevertheless be a virus, and the streptococcus a secondary invader.

Dr. R. F. Montgomerie said that he was very sorry to have missed hearing Dr. Stableforth's paper. He trusted that the essayist would take it as a compliment that, although he (the speaker) had sent an apology for absence, believing it would be impossible for him to be present, he had nevertheless made a great effort to attend. There were one or two points in their own recent experience at Beckenham that he thought might usefully be added to what had been said during the time that he had been present. They had been interested for some time in the question of sulphanilamide dosage in animals, particularly cattle. They knew that Dr. Stableforth proposed to direct his work towards determining the value of the drug in cases of mastitis; they therefore directed their efforts in another direction. Their experience with cattle was that they stood the drug very well indeed, but it was true that one could overdose. He believed it was difficult under ordinary circumstances to set up serious poisoning with sulphanilamide. He thought Dr. Stableforth would accept a dose rate of one gramme per 10 lb. body weight as quite large, yet they could repeat that daily for nine or ten days. One cow to which they gave that dose showed great difficulty in rising and some inco-ordination of gait on the eighth day. She was redosed then and on the morning of the ninth day those symptoms were very prominent. In fact she could raise herself on her hind legs. In the afternoon, having had no more sulphanilamide she rose of her own accord. Dr. Montgomerie said that he would like to ask Dr. Stableforth if he associated some tendency to diarrhoea and inco-ordination of gait with the administration of the drug to cattle.

Continuing, Dr. Montgomerie said that it happened that some of their experimental cows had mastitis and it did appear that the administration of the drug by mouth did act to some extent on the streptococci in the udder as the drug was excreted by that route.

The next point he wanted to make was in regard to the question of the use of the drug in the horse. They had a fairly big stud of horses which was not being handled in just the normal way and their occasional cases of streptococcal pneumonia did not yield to the recognised forms of treatment. Recently they introduced sulphanilamide for that purpose; in those cases they had had dramatic recoveries.

They had had much experience that showed very clearly that one could get a very high concentration of sulphanilamide in the blood and in the milk of cattle by oral administration; in fact, he saw no point in attempting to give the drug by intravenous or subcutaneous injection; they got such rapid absorption by the mouth, even within one hour.

He wondered if Dr. Stableforth had had any experience of the method of preventing summer mastitis mentioned by Colonel Rees-Mogg. Mr. John Brown had suggested to him (the speaker) the introduction into the quarters of BIPP with a view to preventing that serious form of summer mastitis. They did not actually use BIPP, replacing the iodoform with boracic acid, and they did get some evidence that that method appeared to be of some value.

Professor J. G. Wright said that the fact that had impressed him most during the discussion was its comprehensiveness. They had been hopping about not only from one disease to another but also from one species to another. He thought they would be much better advised to confine their discussions to a single entity. The few remarks he proposed to make concerned that disease of the horse in which sulphanilamide preparations were now being extensively employed, which was characterised by the onset of a rise in temperature generally associated with a cough, subsequently developing nasal catarrh and culminating, in many heavy horses, in a fatal pneumonia or pneumo-pleurisy. Were the bacteriologists satisfied that the streptococcus found in such cases was the primary cause of the disease, for, as Mr. Galloway had said referring to strangles, there were features of this disease which suggested that a virus might be the primary cause. He recalled that Dr. J. T. Edwards had some years ago reviewed the literature on the subject and it bore striking resemblance to the condition the Germans described as infectious equine pneumonia.

Three facts regarding this disease had impressed him forcibly. The first was that the incidence of pneumonia was high amongst the heavy draught horses of London, whereas amongst riding horses and ponies it was much less common; in fact, in the latter types the prognosis was good. How might this be explained? He suggested that animal management might be an important factor. His little experience of heavy draught horses in London was that they were badly housed. Stables were inadequately ventilated. The atmosphere was humid, there was an insufficient air change. It was interesting to recall that Coleman was teaching in the Royal Veterinary College, more than a hundred years ago, that the chief factor in the high mortality in horses from pneumonia was lack of fresh air, and that for that reason they should be placed in the open. The second point to which he would refer was the transient nature of the immunity acquired by a horse after an attack of the disease, for one frequently saw a second outbreak of what was clinically the same condition in horses which had recovered some six months or so before. His third point was, would it not be possible to use the serum of horses recently recovered from the disease in an attempt to protect in-contact subjects? He thought that when serious outbreaks occurred in stables of heavy draught horses that this was a line of treatment which should be explored.

Professor G. H. Wooldridge observed that he was afraid he did not agree with Professor Wright in regard to the aetiology of that type of pneumonia to which he had referred. Apparently the main cause of that common type was not a streptococcus but a bipolar organism, though of course streptococcic pneumonia was not uncommon.

Much had been said on the question of vaccination against streptococcus infection; he was one of those people who, while having no great opinion of its efficacy, yet did not scout the idea altogether. He sometimes resorted to the use of vaccines because he felt that he had no alternative, and as they were said to be of benefit he took the view, "I might as well take advantage of this straw." He recalled one very striking example of improvement following the use of autogenous streptococcus vaccine, in the case of a leopard that had a profuse uterine

discharge that was shown to be purely streptococcal in character. He found it quite impossible to handle this beast in the ordinary way and the only possible line of treatment that suggested itself to him was the use of an autogenous vaccine. He got this put up and the way they were able to use it was to coax the leopard into a corner of the cage (from the outside), and when somebody was busy distracting the animal's attention at one end, he grabbed its tail and injected the vaccine into the lower surface towards the base. That was repeated on several occasions and the discharge cleared up, as did the malaise from which the beast also was suffering.

Dr. Hare had referred to streptococcus infections in dogs that might have had distemper. In early days he (the speaker) was of the opinion that many of these so-called secondary attacks of distemper were not attacks of distemper at all, but were of a different type altogether, in some instances being due to streptococci and in others to *Bacillus bronchisepticus*.

In regard to immunity, in his opinion the immunity given by the serum-vaccine treatment as a preventive measure to distemper was a definitely waning immunity and, that being so, it was quite possible for second attacks to occur in them. On the other hand, dogs that had had distemper and had been very carefully guarded and attended, had, in some instances, when somehow they had later accidentally come in contact with distemper, gone down with some of the most serious attacks he had witnessed and almost always with fatal results. These experiences had led him to believe that prolonged immunity was due to a repeated intake of infective material before the first immunity was lost and that by this means the immunity became consolidated and maintained.

In connection with the alleged transmission of streptococcus infection by service, he wished to ask Dr. Stableforth if there were any clinical symptoms in stallions in the semen of which streptococci had been found. Was there any sign of orchitis? He recalled seeing a case at the laboratory of Dr. Poëls, of Rotterdam, of a stallion whose mares after service invariably showed symptoms of influenza, and upon examination of the testicles no clinical abnormality could be found. The vesiculae seminales were apparently the reservoir of infection. Concerning the treatment of streptococci infections by prontosil or sulphanilamide, Dr. Hare had said that it was useless to give these agents unless the organisms were in the blood stream; if that was so, what was the use of administering them in conditions where that allegedly essential circumstance did not obtain, as in mastitis when the streptococci were mainly in the mammary gland?

Dr. Hare had suggested that it was not of any value to give them in cases of strangles until the later stage, with pneumonia, had appeared and the organisms were in the blood stream, the temperature being the guide as to that. They had, however, heard that evening that few cases of strangles failed to recover unless complicated with pneumonia, but that secondary affections were common; therefore would it not be of more value to use these agents in the earlier stages in the hope that they would attack the organisms before they invaded the blood stream and, by reducing the degree of bacterial infection, so reduce the likelihood of those complications and cut out all those sequelae of rearing, etc., which might be due to streptococcus infection?

Mr. S. L. Hignett observed that it was a matter of great importance not to administer prontosil in combination with anything else; in particular, with sulphates—it was a very dangerous drug under such conditions.

Mrs. Thompson spoke to having used prontosil for the treatment of chronic abscesses in cats; she found it most efficient.

The President (Dr. J. McCunn) said that Mr. Hignett had quite rightly drawn attention to the danger of prontosil and similar agents. Prontosil was a toxic thing, especially when sulphates had been taken into the body, whether in drug form or even in the form of eggs. There had been quite a lot of serious results which could be attributed to this factor. He could quote them two cases, one of which was witnessed by Mr. Jones. The first was in a horse. This animal had a fit exactly in the same way as a dog had a fit—it was the first case of the kind he had seen in a horse. The animal had received only 40 c.c. prontosil instead of the advised amount, *i.e.*, 120 c.c. He (Dr. McCunn) went up to see it and was examining the ocular membrane when it immediately had a fit. It swung its off-fore in the air; its head was turned upwards and backwards and it pirouetted on its hind legs, while champing of the jaws was exhibited. The animal was deeply cyanosed and Mr. Jones, who arrived at the precise moment when it fell to the ground, pronounced it as finished. They gave the horse 2 c.c. coramine straight away and left it for a time. In half-an-hour a message came that the horse was up again and apparently it had returned completely to normal.

Some time afterwards a veterinary surgeon sent two dachshunds up to him. He (the veterinary surgeon) could not make out what was wrong with them and neither could the speaker. They danced exactly like marionettes and one would have thought that something was burning their feet. The veterinary surgeon told him that he had given each dog a 7½ gramme tablet of prontosil. They got in touch with Messrs. Bayer, who said that the prontosil was probably responsible, but that the practitioner must have given some sulphate, and that proved to be so. As a result of this latter information he found also that in the case of the horse magnesium sulphate and potassium nitrate had been put in the drinking water. It might be of interest to members to know that the antidote was bicarbonate of soda and large doses of sodium bicarbonate and bismuth carbonate were administered to the dogs with satisfactory results.

He thought that, in the horse, the most convenient method of administering prontosil was by the intravenous route, but some of his medical friends told him that the drug had a much better effect if it was given by the mouth, and when the occasion arose he intended to try this in horses.

The Reply

Dr. A. W. Stableforth, in reply, dealing first with Mr. Bushman's observations regarding vaccination, said he would be inclined to ask him whether he thought outbreaks of strangles that occurred nowadays were of the same severity as those occurring in the earlier days to which he had referred. They knew that the mortality in various diseases did vary considerably in different outbreaks and at different periods. It

should be a valuable experiment if in the stable to which Mr. Bushman had referred some animals could be left unvaccinated.

Mr. King had given them a description of what would appear to be a new disease and it would be most interesting to be able to follow it up to see just what kind of streptococcus was present and its distribution in the various lesions detailed. The dose of prontosil he seemed to have been giving was not, he should think, at all adequate.

Colonel Rees-Mogg had referred to summer mastitis in bovines. The causative organism of this form of mastitis was *Corynebacterium pyogenes* and the conditton did not therefore come within the scope of their discussion; nor did mastitis in ewes, which was usually a staphylococcus infection associated with toxaemia produced by the specific toxin of that organism.

Dr. Hare had taken him to task for being too definite regarding the pathogenicity of the various serological groups of streptococci of different species. It was, of course, well known that members of a given serological group were not entirely confined to one species, *e.g.*, that the streptococcus concerned in cases of severe, even fatal, disease in humans might belong to Group B, Group C or to other groups besides Group A. He (Dr. Stableforth), however, had shown that in the table and in his comments. Nevertheless, there was no question that the great majority of serious streptococcus infections in humans were due to Group A streptococci, that chronic bovine mastitis was due to Group B, practically all equine infections to members of Group C and so on. It was only practicable to show the outstanding facts in such a table as he had prepared. It was also, of course, possible that the broad groups at present recognised might have to be divided as knowledge increased.

He was interested in Dr. Hare's observations on pigs which, in conjunction with the observations of the French worker to whom he had referred, suggested that streptococci as a cause of disease in pigs might be more common than was at present realised.

Dr. Hare had made reference to a large outbreak of disease due to streptococci in a kennel to which a dog had been returned after a show and in which nearly all the animals became infected within three weeks. He would not at the moment question whether the streptococci were the whole cause of the trouble, but he felt that they needed more information. They wanted to know whether the finding of haemolytic streptococci in those dogs really was due to the introduction of a new infection or whether pre-existent streptococci suddenly became pathogenic, possibly due to some other factor. They knew from their own observations that haemolytic streptococci were not at all uncommon in apparently normal animals.

Dr. Hare's observations on vaccination had emphasised some of the difficulties of vaccination. Its foremost exponents had, as he had reminded them, stressed the necessity of repeated dosage and indeed of following the response to their use by blood examinations and of grading subsequent doses on that basis.

Mr. MacIntyre had also referred to vaccination. In time, of course, it might be possible to prepare a vaccine against streptococci, but the fact remained that at the moment they had no vaccine on the market for general use that had been shown to be effective.

Dr. Hare had stated very definitely that "the only use of prontosil was to kill streptococci that were in the blood stream"; that was not correct, because they obtained, not only a good concentration in the blood after administration, but also a saturation of all tissues of the body except bone and fat. It might prove of little value in the more chronic infections but not because it did not get into the tissues.

With regard to Mr. Galloway's observation, it was true that the way in which strangles spread rather suggested that it was due to a virus; some evidence of this had been produced. Nevertheless, there was little doubt that the streptococci were responsible for the secondary symptoms and for that reason it might be important to take measures to deal with it.

Dr. Montgomerie had spoken of the use of sulphanilamide in cattle and the symptoms after dosage. He (Dr. Stableforth) had not intended to go into the details *re* the use of sulphanilamide and the effects that might follow, but he could say that they had administered large doses of the drug to horses, cows and dogs over a long period and they had never yet encountered serious symptoms. They had met with inco-ordination of movement some two to five hours after treatment, but only with doses that were far larger than it was necessary to give therapeutically. Diarrhoea occurred often in cattle but it disappeared 24 hours after dosing ceased.

The dosage of sulphanilamide they had found to give useful concentrations in the blood and milk of cows was 1 gm. per 5 lbs. body-weight, to be repeated in about 48 hours, or 1 gm. per 10 lbs. body-weight daily. As to toxic symptoms, it might be that certain animals were particularly susceptible and it might be that with certain types of food there were more chances of untoward symptoms, but that they had yet to find out regarding animals.

He had had no personal experience of using BIPP for summer mastitis but he knew that while some veterinary surgeons had good results with it, others found it too irritant; therefore it seemed that the boracic treatment introduced by Dr. Montgomerie might be useful.

In his view, there was no reason whatever why they should not give prontosil or sulphanilamide by the oral route; there was in general no advantage in giving it either intravenously or subcutaneously.

In reply to Professor Wright, Dr. Stableforth said that regarding the use of serum from a recently recovered animal, it might be of considerable value, but the serum from an animal which had been artificially immunised should be even more useful because it would be more potent.

He was interested to hear Mrs. Thompson's reference to her experience in the treatment with prontosil of chronic abscesses in cats, the more because they themselves had done no work on that animal.

Finally, he thought that it would be of great value to try out the effect of proper doses of sulphanilamide in certain infections, *e.g.*, in strangles, equine pneumonia, joint-ill, bovine mastitis and the canine infections, endeavouring at the same time to find out the exact nature of the associated organism and to take a few blood samples to see that a sufficient concentration of sulphanilamide had reached the blood or milk. If that could be done he thought they would obtain useful information as to the real value of sulphanilamide.

The Problem of Cruelty to Animals*

R. GLAVE SAUNDERS, M.R.C.V.S.
EXETER

The problem of cruelty to animals is one which should, and does, most intimately concern every member of our profession. It is at once a problem baffling, worrying, but of much fascination to the zoologist and psychologist, and it should be approached from humanitarian and evolutionary standpoints. I can claim no special knowledge or training for dealing with so intricate a subject, except such as a long life spent among animals and an instinctive love for all animals gives one (a love which, I have to recognise, is often illogical and irrational). I suppose most veterinary surgeons are really more interested in, and fonder of, animals than of members of their own species, although again such preference may often appear illogical. Paraphrasing a well known remark: it is not that we care for men less, but that we care for animals more.

May I here state a little problem and fact which often furnishes me with food for surmise. In one of his works Darwin states the fact that all dogs are born with an instinctive love for members of the human species, that is for a species other than their own. He goes on to surmise that this is the only instance of such a thing having evolved in the whole animal kingdom. And it would be certainly very difficult to prove that, say, the human species is born with an instinctive love for members of even its own species; dogs are certainly not born with that love for their own species. But, although Darwin does not mention it, are not a proportion of the members of the highest civilised races born with an instinctive love of all animals? Here surely, then, are two evolutionary miracles?

When, in the middle of last century, we had to abandon the biblical account of the creation of the world in six days, we still had to accept the fact that, although—according to some divine plan—the world has been created by the infinitely slower process of evolution, it has been created as a unified whole, each species of animals and plants having an important place in it. Consequently it appears to be quite unnatural that one species, the human, should over-run the whole earth, and, in doing so, massacre all the larger animals, which are the most nearly related to it. Furthermore, are we not likely in the long run to pay very dearly for ignoring such inexorable natural laws?

Evolution has taught us, or should have taught us, that because of our undoubted descent from an animal stock, and our actual "blood relationship" to it, not only are we constructed on exactly similar lines, but, because of all these things, we have no right whatsoever to exploit animals, especially the higher animals. (Incidentally, I feel strongly that all biologists, if not all scientists, should once and for all cease using the expression "the theory of evolution" when we are referring to one of the basic facts, if not the basic fact, of all scientific knowledge and progress. To do so is as illogical as if we spoke of the theory of gravitation just because we happen to be entirely ignorant of the cause of gravitation and how it works. Is not our knowledge of evolution very much greater than our knowledge of gravity?

Coming to grips with this problem of cruelty, we are at the outset severely handicapped in dealing with the question. Not only have animals no articulate language with which to transmit to us what rudimentary thoughts they have (an American writer remarked with absolute truth that "even an oyster has fads"), but some animals (*e.g.*, the horse and cow) are so inarticulate in the way of vocal sounds of any sort that only when pain reaches the point of being excruciating do they give us undoubted indication of the fact. Indeed it is surprising the amount of pain these animals can "stand up to" without showing any evidence of it to a casual observer. Darwin in "The Expression of the Emotions in Man and Animals" remarks: "Hares and rabbits never, I believe, use their vocal organs except in the extremity of suffering; as when a wounded hare is killed by a sportsman, or when a young rabbit is caught by a stoat. Cattle and horses suffer great pain in silence; but when this is excessive, and especially when associated with terror, they utter fearful sounds. I have often recognised, from a distance on the Pampas, the agonised death-bellow of the cattle, when caught by the lasso and hamstrung. It is said that horses, when attacked by wolves, utter loud and peculiar screams of distress." To which he adds a footnote: "A lady communicated the following description of a horse screaming: In a crowd in London the horse fell and got under the wheel of a carriage; the scream rang in our ears for days afterwards, as the most expressive of agony that we had ever heard." Good examples of this inarticulate suffering occur in horses with "quittor" or "poll-evil," which must give rise to excessive pain in the early stages, especially in the former condition where an unyielding horny box prevents any

*Address to the Western Counties Division, N.V.M.A., at Launceston, June 15th, 1938.

relief by swelling; or in cows with neglected decomposing abnormally presented foetuses.

Of course, no one could maintain that animals as a whole are as sensitive to pain as the human species, unless it be someone looking round for an easy way of earning a living and starting a new animal protection society, of which we have too many, leading to considerable overlapping, and often, as I have reason to know, actual antagonism and opposition. Such a view would be as illogical as to suggest that animals could think and reason to the extent possible to us; although, in the evolutionary scale, sensitiveness appears long before any approach to intelligence. On the other hand we have to admit that some species of animals, and more especially certain members of those species, appear to be more sensitive to pain than members of certain primitive tribes of the human species, or even certain individuals of highly civilised races. One comes across individual horses, dogs, monkeys, etc., which seem very susceptible to pain, nor is it always those which are the most highly bred. The same remark applies to the feeling of emotion. I believe observers who have closely studied birds maintain that they have reached a higher emotional plane than we have.

It is a recognised fact that healthy elephants will sometimes die quite suddenly from nervous shock, such as results from experiencing a tropical storm when in an unfamiliar stable; or even from having their feet gnawed by rats at night when the actual injuries were quite insufficient to cause death. A year or so ago an adult elephant which had been at the Bristol Zoo for some years was sold, to be replaced by a younger one. The keepers were very attached to him, as he was to them. It took them the whole of one day to entice him into the pantechnicon for his transport, but by nightfall he was locked up safe and sound. Next morning on unlocking the van they were startled to find him dead, and the head keeper, Mr. Payne, was not ashamed to own to me that he shed tears for his old friend. On thinking the matter over, Mr. Payne and I quite independently of each other reached the same conclusion, that the animal had died from "a broken heart," *i.e.*, from nervous shock. Miss Cunningham's young gorilla "John Daniel," which lived for some time in her house in Sloane Street under conditions exactly similar to those of a human child, died from grief soon after leaving her. When the two young gorillas, Moina and Mok, at the London Zoo were being transferred separately from the temporary house to their permanent one, the one left behind was found in tears. It is common knowledge that seals shed tears. A minority of dogs show excessive grief when parted from their owners. I remember a friend leaving an Irish terrier (the sole companion of a childless couple) in our boarding kennels, when he showed all the appearances of progressive mental derangement—"going out of his mind," as our kennelman put it—with gradual loss of appetite. A week later I happened to be watching him in the run when he heard the voice of his owner—he could not see him—who had come to fetch him: immediately he was his old self again; the sudden change was startling.

When we come to consider those animals which man has domesticated and used for his own ends, and the incidence of cruelty consequent upon such change in their lives, we have to—or, at least, we do—recognise two kinds: preventable and unpreventable.

In the former category I should include docking. As far as my knowledge and memory serves me this has always been a somewhat unofficial, unscientifically recognised operation; at least it was never mentioned during my three years at Camden Town in the early nineties, and I am sure it was not referred to in the two or three text-books we possessed in those days. But we have to please our clients (if we will not do it someone else will, and we lose a client as well as the operation), and it pays. Nevertheless I have to own that I have come to the conclusion that it is quite unnecessary. Had we never seen a docked horse but saw one for the first time, we should exclaim: "How ugly." There can be no question of its cruelty. Although now always performed under an anaesthetic there remains the healing of a large wound involving many structures after chopping off the end of the spinal column. Added to this there is the constant irritation due to flies, especially if turned out to grass. I have never docked a horse for my own use and I am unconvinced that we are justified in mutilating a beautiful animal because a careless driver may get a rein under the tail. Quite recently I almost, if not quite, persuaded one of our leading British authorities on horsemanship (whose name is a household word) that docking is unnecessary, for he eventually wrote me: "I cannot quite make up my mind about it; perhaps, after all, it is, as you say, largely a matter of fashion."

Another form of cruelty usually looked upon as unpreventable, but which seems to me capable of some amelioration, is the taking of calves from their mothers when only a few days old. Anyone living on or near a farm can have little doubt of the mother's distress; light sleepers may be kept awake all night by their bellowing. It does not pay the farmer to rear the majority of calves born, nor to feed them on whole milk after the first fortnight. Calves should be killed for veal when not less than six weeks old, but many are killed much younger than this, while a few—so my information goes

—are killed immediately after birth without ever having a meal. Without being a farmer, I have often wondered whether from a national standpoint it would not be more profitable to turn superfluous milk into veal or pork than to sell it to factories at less than sixpence a gallon for the manufacture of luxury products, such as milk chocolate, sanatogen, ovaltine, etc. The result of such a policy would be that calves would not be slaughtered as young as under present conditions. Furthermore, would it not be possible for a humane farmer to devise some method by which, although the calf was being hand-fed on an artificial ration, the mother would not entirely lose sight of it?

Turning to another preventable cruelty, is not the time long overdue to suppress by law or bye-law the altogether senseless practice of overstocking? I fail to see one redeeming feature in favour of it. Were farmers as a class less conservative and more co-operative they would long ago have banished such a barbarism with such practices as incising the tail and rubbing in salt for an imaginary "worm in the tail," or introducing a goat into a herd as a cure for contagious abortion.

When cows arrive at a market with abnormally distended udders, an impeded gait and, more often than not, jets of milk flowing from the teats, we are so often told (by some veterinarians as well as farmers) that if a cow is chewing her cud and is able to relieve herself of her milk she is in no pain. Do either of these contentions amount to anything at all? Taking the first point: is it possible for pain to arrest the normal process of rumination? If it were possible for pain to be so excessive as entirely to stop an animal feeding, then, having a comparatively empty rumen, she would not chew her cud, but not otherwise. Does a man with toothache stop mastication? Yet, in this case, the seat of pain is much nearer the receptive organ, the brain.

Again, when it is maintained that with milk flowing from the teats there is no pain, are we not regarding the act as a voluntary one, like the emptying of the bladder? Surely it is more in accordance with the facts to regard it as an entirely involuntary act due to the abnormal pressure within the gland being sufficient to overcome the resistance of the sphincters, the tension necessary to bring this about resulting in pain. Apart from the question of pain, does not overstocking always interfere with the present and future functioning of the organ? And is it not often an initial cause of mastitis, that bugbear of every country veterinary surgeon? Of all cattle diseases I always found this the most difficult to deal with and treat. During a discussion at a meeting of the Lancashire Division of the N.V.M.A. last year three speakers referred to this matter. Major Mattinson said: "I consider that overstocking is the greatest individual causal factor of mastitis and it will remain unchecked so long as the present system of 'bagging up' newly calved cows is adopted in marketing them." Mr. Matthews, of the Veterinary Department of the Liverpool City Council, remarked: "I am quite sure that stocking-up dairy cows in the market is worthy of the profession's attention." Mr. Downham added: "I share the opinion about overstocking: it is a cruel and unwise practice," while in America, Professor Udall, of the New York Veterinary College, has recently said: "Excessive engorgement causing severe acute inflammation of the udder is observed when milk is allowed to remain in the udders of fresh cows on exhibition." Did not the inflation method of treating "milk fever" act in much the same way, by —temporarily, at least—checking or arresting the secretion of milk and the consequent mineral drain on the system?

One final, but important, point in dealing with this subject. The udder of the modern dairy cow has been evolved by man to secrete not only an abnormal quantity of milk, but to continue that secretion for the greater part, or the whole, of the year. Compared with the organ of a wild cow it is very much larger, with a corresponding increase in the size of blood vessels, lymphatics and nerves, and with a largely increased sensitiveness. Such an abnormal organ is liable at all times to come into contact with all manner of bacteria-laden dirt and faeces each time the cow lays down, in addition to coincident chilling of the organ by whatever it comes into contact, not forgetting the stream of cold air flowing under ill-fitting cowshed doors when housed in the winter. Can we wonder at the prevalence of cases of serious mastitis in the dairy herd, which must be very painful and which often lead to necrosis of one or more quarters? I can recall one case of necrosis of all the quarters of an udder, followed by sloughing of the whole organ, resulting in the recovery of an udderless cow. The best, and only effective, legislation would be a bye-law similar to that which obtains in some of the Scots markets: to make compulsory the milking-out of all cows on entering the market. Apart from all other considerations, this procedure is necessary to enable the veterinary inspector to examine the udder for tuberculosis, etc. To protect a buyer under these circumstances, could not the cows be sold with a guaranteed milk production, which if not reached within a week of the sale would warrant the return of the cow or a return of a portion of the purchase money?

As a result of overstocking the cows the calves are necessarily subjected to varying degrees of cruelty. Not only are they kept

without their natural food (which is food and drink to them), sometimes from teatime on one day until the afternoon of next day, but, in addition, they are often driven long distances on roads congested with motor traffic. When eventually they do get a meal they take far too much, leading often to colic and diarrhoea.

Another problem, which should, and does, concern every member of our profession, is the humane slaughter of the food animals. Although the humane slaughter of the smaller animals is not an entirely solved problem, with the perfection of the Temple-Cox captive bolt pistol the humane slaughter of the larger animals has long ago passed the experimental stage and can now be considered a problem solved once and for all. This being so, our profession—had we adequate representation on our governing bodies, which we have not—should have been able to prevent the mutilation of the Humane Slaughter Bill by the butcher interest. The official attitude of the butchers has been consistently conservative, irrational, and—in relation to their own material interests—strangely short sighted. Less meat is being eaten, one of the reasons being that the actual or imagined butchery has driven many thoughtful and fastidious people to vegetarianism or semi-vegetarianism. For years the butchers maintained that to kill pigs by previous stunning interfered with the keeping qualities of the pork and often produced that ill-understood condition known as "blood-splash." These two objections were disposed of long ago. During the discussion of the Bill in the House and at the eleventh hour they suddenly forgot their concern over pigs and, for reasons best known to themselves, and with consummate inconsistency, said in effect: "We will agree to the inclusion of the pig, but if you include sheep we will talk the Bill out." Therefore we had to be content with the two-thirds of the loaf as being better than no bread. But is it possible that anyone capable of weighing evidence should have the slightest doubt that the captive bolt or bullet is a more humane method of slaughter than the poleaxe or knife? Surely when animals have to be sacrificed to human needs they should be despatched as humanely and scientifically as possible, leaving no room for any doubt or accident.

The Bill also permitted two other illogical exceptions, namely, it excludes pigs from its provisions where the slaughterhouse has not an available electricity supply, and also all animals killed on farms for home consumption. The first exception is quite illogical, inasmuch as it implies that all butchers are willing and anxious to use the electro-lethaler, whereas the majority of them had, I imagine, never heard of it. The second exception is equally so, for the average farmer or even the village slaughterer is quite often the merest amateur at the job. Quite recently we obtained a conviction against a farmer for killing a cow by cutting its throat in a bungling manner; the County Veterinary Officer reported the case and gave evidence in court.

Another phase of cruelty, which is often overlooked, is the indiscriminate giving of drugs by the ignorant and thoughtless. Taken as a whole, are not drugs, being drugs, poisons? Therefore they seldom have a neutral action: if they fail to do good they do harm, especially on an already ailing animal. When a practitioner is in doubt either as to the actual diseased condition or the action of a particular drug and his client is expecting the administration of some sort of dose, is it not much more scientific to give a placebo than to experiment on an unprotesting animal? Nearly a century ago Dr. Oliver Wendell Holmes, a wise medical observer as well as a humane and illustrious thinker, expressed in characteristic fashion the conclusion to which he had come: "I firmly believe that if the whole materia medica could be sunk to the bottom of the sea it would be all the better for mankind and all the worse for the sea." Thirty years ago Sir William Osler, Regius Professor of Medicine in the University of Oxford, declared that *he is the best doctor who knows the uselessness of drugs.* And about the same time a leading doctor wrote thus in a popular scientific work: "It may briefly be said that in our own day the doctors are giving up drugs and the public is taking them up; they are being abandoned by experience and adopted by ignorance. We speak, of course, of drugs as a whole; the few great exceptions, such as quinine and mercury and iron, go to prove the rule." Another rather pertinent fact with us is that our patients are insusceptible to faith cures as the result of drug taking.

Being myself particularly susceptible to certain drugs (a week of cocktail drinking would nearly kill me), I feel that we as a profession do not always discriminate sufficiently. When giving nauseating drugs like calomel or the purgative oils, or colic-producing ones like Epsom salts, ought we not often to think twice before inflicting them on an animal which is unable to tell us how bad it feels afterwards, or even before? And when we come to the layman, especially the farmer and dog owner, we can only guess the amount of cruelty resulting from this insane dosage. Every practitioner deals with thousands of cases of animals well nigh "drugged to death" before his advice is sought. In too many cases the animal dies, the drug or drugs being "the last straws," while in others the animal recovers largely through the withholding of further drugging. One can recall cases of horses killed

with overdoses of Epsom salts (and what a death); innumerable distemper cases which would have recovered with good nursing but for the administration of certain "cures" known to the owner and recommended by his numerous friends, given one on top of the other; routine doses of physic which were quite unnecessary when not entirely harmful; to say nothing of careless drenching (especially in cases of "milk fever," when the animal was unconscious or only semi-conscious) producing bronchial and lung trouble, or even sudden death, especially in cows. After 40 years' practice I have long come to the conclusion that good nursing and correct dietary "cures" more cases than does the giving of drugs. Did not the late William Hunting contribute a short article in the *Veterinary Record* suggesting that if by some magic the contents of all the bottles in our pharmacies were replaced by solutions of common salt but retaining their scents and tastes we might get much better results.

Another form of cruelty is more often met with in outlying country practices and is due to carelessness, lack of observation, or poverty, as when a smallholder has to think twice or thrice before incurring the expense of a professional visit. I refer to cases of delayed or difficult parturition due to the owner having failed to observe the initial stages of the act, or, if he has, not having regarded them seriously enough, hoping against hope for a successful issue. (I imagine that medical practitioners never get these cases; their trouble is in being so often called too early). These are often cases where mares and cows have been turned out and not kept under close supervision. As the time for parturition approaches, instead of being inspected every few hours, these cases are often left unobserved for long periods, especially during the night. I can recall many cases where clients had failed to notice the loss of the placental fluids (again, often having taken place during the night) with the consequent decrease in size. When subsequently seen the patient is exhausted and quiet and the owner either fails to observe that anything has happened or else persuades himself that such is not the case. Those of us with large cattle practices can recall dozens of cases where we have been called hours or even days too late, to find ourselves confronted with a very difficult task, which, if we had been present at the right time, would have been an easy and simple one. After one, two or three hours of back-breaking work, with consequent pain to the poor patient, we manage to deliver the calf, usually dead and often decomposing; the cow has a long painful illness, sometimes ending fatally—all of which could have been prevented by just ordinary care. I always tried to persuade owners to watch these cases day and night, not only seeing but examining them the last thing at night, the first thing in the morning, and during the night when necessary. I recollect one difficult case: abnormal presentation, decomposing calf, no trace of placental fluid, with the uterus contracted on the foetus like a glove on a hand—the sort of case that makes the heart of the obstetrician "go down into his boots". On asking the owner when he first noticed any calving pains, he coolly replied: "a fortnight ago." Without stopping to think I remember saying: "You ought to go to prison for cruelty."

Other exasperating cases are those where an owner, lacking the technical knowledge and skill, often even failing to wash very dirty hands and arms, does all he knows before we reach the case, and often pretends that he has done nothing. Such a case—frequently quite an easy one to deal with—may result in septic metritis, possibly with a fatal termination, for which the obstetrician gets all the blame. Again my advice was: "If you propose dealing with the case yourself, thoroughly wash and soap your hands and arms, examine the position of the foetus, and before attempting anything, make up your mind whether you can or cannot deal with the case." My partner and I found it a good plan to charge a lower fee when an animal had been untouched when we reached it.

Another source of pain and cruelty is, I believe, the infestation of cattle by warble larvae. Many, if not most, farmers seem to hold a fatalistic belief that these cases are inevitable; consequently they take no steps at all to eradicate the pest, or they take only half-hearted ones, which are useless. Surely the presence of these parasites under the skin by the pressure they cause and the irritation they set up must give rise to considerable pain. I expect some of you to disagree with this view, maintaining that because the animal in the best condition is the one most often affected, the parasites can have little effect on the bodily welfare. But does it not rather suggest that the flies tend to select the healthiest animals, or that the parasites flourish best in the healthiest beasts? In any case I do not agree that pain invariably, or even usually, leads to perceptible loss of condition. A leading butcher, however, an ex-President of the National Federation of Meat Traders, who is closely in touch with the farming community, recently expressed the opinion to me that badly affected animals suffer a good deal of pain. He said that it is a well known fact that milking herds when badly affected lose 10 per cent. of their milk yield and that fattening cattle take three weeks longer to mature. Personally I feel that this condition will not be eradicated until all cattle are periodically dressed and that meanwhile

badly warbled beasts should be excluded from markets as an inducement to farmers to carry out the law thoroughly and not in a half-hearted manner, which they seem to be doing at present.

Lastly there is the vexed question of performing animals, which only concerns us in its ethical aspect. The R.S.P.C.A. is promoting a bill to render illegal performances by apes, monkeys and the larger carnivores, but include dogs. They agree, as a compromise, to except horses and elephants: and I think there is some justification for this point of view. Knowing as I do—in common with you all—something of a horse's temperament and mental make up, I can never imagine horses learning to do any trick by being subjected to cruelty or fright, and, although I know very much less about them, I should say the same remark applies to elephants. Personally I dislike all animal performing acts; they are so unnatural in every way. A dog on its hind legs trying to walk like a man, or a horse trying to waltz are ugly objects to anyone who is really fond of animals. Most of the training involves cruelty, and even when an animal has learned his trick it is equally cruel to expect it to go through that particular performance at exactly the same time once, twice, or three times each day, especially with temperamental animals such as apes and monkeys. And not only this, for the performance has to take place under such very unnatural and unhealthy conditions: crowds of people noisily applauding; the glare of stage lights; a blatant brass band; an unhealthy overheated oppressive atmosphere—in fact, under conditions which often unnerve staid actors and actresses, who have chosen this particular profession of their own free will and who understand why they are subjected to such an artificial combination of nerve-racking experiences.

These are a few of the problems which present themselves to the ordinary practitioner. There are others, which I have not time to consider, and—if human thought is a prógressive thing—still others which may await solution by a younger generation than mine. (Incidentally I was very pleased when the Vice-Principal of the London College, Professor Wooldridge, told me recently that he never allowed the students to do the simplest operation on a dog without using an anaesthetic. Does not this suggest a telling slogan for us all? Always to "give the animal the benefit of the doubt.") Among such cruelty problems which still need close attention, may I suggest: the use of pit ponies because they are cheaper than electric traction; the importation of wild animals, especially the large apes, monkeys and animals from tropical countries; modern methods of egg production, etc. And finally, for the consideration of future generations, such matters as excessively high jumps for horses, which are not, like deer and antelope, born jumpers; stag hunting at home and pig sticking abroad, etc.

Discussion

In the discussion which followed, Mr. H. W. Townson expressed the view that horses were inadequately protected. Horses of any age could be castrated without the use of an anaesthetic; quacks still docked many colts. He doubted if dogs could be taught tricks by cruelty. He agreed with Mr. Saunders' observations on the use of drugs: many dogs were killed by the indiscriminate use of worm medicines.

Major W. Ascott said he agreed with a good deal of what Mr. Saunders had said, but not all; for example, he thought dogs would not perform unless kindness were practised. Many years ago Mr. Woodruff presented a paper at Plymouth in connection with drugs, and someone at that meeting said he wondered if drugs were of any use at all. However, worm medicines could not act as a faith cure. He would not care to defend the docking of horses as it used to be done. Nature, however, was cruel and animals had to be adapted for certain purposes. He thought it was rubbish to say that tail hair was of importance in connection with warding off flies. There was no cruelty when foals were properly docked: it was not as cruel as castration—there was a wound to heal in both cases. A cart horse was better for being docked. Money spent on the R.S.P.C.A. was money spent on a good cause, but he would like to see more money expended on the prevention of cruelty to children.

Mr. G. Gibbings remarked that in his view docking was a cruel and barbarous business. Horses docked when adult never forgot it. He doubted very much if there was any pain in an over-stocked udder. Paddling with the hind limbs in cows was often ascribed to pain but it was probably due to pressure on the thighs by the udder. Cows with obstructed teats showed no evidence of pain. There was a plug in the ends of teats when cows were drawing for calving. If there were anything in overstocking, cows ought often to be milked more than twice a day and also before calving. As to the weaning of calves, perhaps it would be better if they were left on their dams until they were a fortnight old, but there would be just the same distress if they were taken away at three months. He agreed with the remarks about drugs.

Mr. C. Masson said he agreed with Mr. Saunders' remarks concerning docking and overstocking. With regard to the destruction of dogs he still thought the injection of prussic acid into the heart was a very humane method and often better than shooting.

Mr. H. Fraser stated that it was the practice in many places to take the calves away from their dams forthwith: they never sucked their dams. It was thought by some people that the cows milked better under these conditions.

Mr. A. Mather thought that many animals liked to perform tricks; for instance, dogs liked to beg.

Mr. S. J. Motton said that the problem of pain was a difficult one. The temptation was to assess the degree of pain by human standards, and that might be a dangerous line. Animals were entitled to the benefit of the doubt. Nevertheless, there were some operations performed on horses

without anaesthetics, and immediately after such operations the animals proceeded to feed. He doubted if men subjected to similar operations under the same (cruel) conditions would immediately after their performance, call for a meal. With regard to docking, he remembered the senior partner of the firm to which he and Mr. Saunders belonged, once saying that it was a poor compliment to the intelligence of man that after centuries, he still had to make the horse fit the cart. He feared that fashion had a great deal to do with docking. Sporting men sometimes said that spaniels were docked so that they might not damage their tails when working, but the same dogs were bred with ears so long that they often got into trouble.

Mr. W. G. Blackwell, observing that Mr. Saunders had referred to the need for a ban on the importation of wild animals, asked what Mr. Saunders thought about the practice of keeping pet monkeys.

The President (Captain J. K. Irvine) after complimenting Mr. Saunders on the quality of his paper, asked him to reply to the discussion.

The Reply

Mr. Saunders thanked the members for the interest they had shown in the paper, and said that many points had been answered by members in the course of the discussion.

He was amused to find that two of the older members of the Division disagreed on the question of docking horses.

Mr. Blackwell had referred to the question of keeping monkeys. He had kept many and that had given him an opportunity to form the opinion he had expressed. Most of them were given to him by people who had found that they could not look after them properly. He thought that large apes and carnivores might be imported under licence but only when they were to be taken to properly conducted zoos which were not run for profit. Monkeys were very delicate and he thought that probably half of those which were imported died from painful lung disease. Many of the others were killed humanely (or in-humanely) for biting children. In this country there was a very large business in the importation of wild animals because English people were very fond of animals, but it led to suffering. There was very little importation of these animals into Germany, probably because the Germans had not the money.

He disagreed with Major Ascott's observations in connection with the function of horses' tails as fly whisks.

He thought that, in the case of some cows, it was necessary to milk them before they calved.

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was revealed to be a thin elastic ring encircling the region of the leg *subcutaneously*. The ring was cut and pulled out whereupon the wound healed in several days under simple treatment.

It appears that the rubber ring was put on the leg (probably by children in the street) and had cut through the skin which later healed over it, leaving only several punctures through which pus drained away.

It is not uncommon to encounter a rubber ring around the neck of a dog or cat causing a deep injury, but the case reported here is somewhat unusual.

CLINICAL COMMUNICATION

Peculiar Foreign Bodies in the Dog

I. FUNDAMINSKY, M.R.C.V.S.
The Animal Hospital, Berket-es-Sultan, Jerusalem

Case I.—Safety Razor Blade "Eaten Up" by a Dog

Subject.—Wire-haired terrier bitch, 20 months old.

History.—The bitch was brought at 9 p.m., in May, 1938, it being stated that about two hours previously she had picked up a Gillette blade from the floor, chewed and broken it to pieces, swallowing some pieces and dropping the rest on the floor.

Examination.—The animal looked as if nothing had happened and was bright and happy. Exploration of the mouth and throat failed to reveal any injury at all. The whole story seemed to be incredible.

Treatment.—The owner had already given her plenty of raw meat; nevertheless, some mashed potatoes were pushed down the throat and an injection of apomorphine was given later. Vomiting set in in about five minutes; the potatoes came first, followed by the meat, then some mucus came along in which four irregular fragments of a razor blade were found. Further vomiting produced nothing abnormal. One feared, however, the presence of more fragments in the alimentary canal, and as the owner did not agree to go to the expense of an X-ray a diet was ordered consisting of cotton-wool pledgets "sandwiched" by slices of meat for the next two days, together with small doses of liquid paraffin, but nothing abnormal passed *per rectum*. The dog was seen later enjoying good health.

It seems remarkable that the fragments of a sharp razor blade, the largest piece of which measured about half-an-inch, with irregular points, should have passed all the way to the stomach and back without causing the slightest injury.

Case II.—Elastic Ring Buried Under the Skin of the Metatarsus

A cross-bred dachshund dog was picked up as a stray and brought to the hospital in June, 1938. The animal was limping on the left hind leg. There was a deep impression round the metatarsal region with several fistulae discharging pus. The case appeared to be one of cat bites, but on probing the fistulae one got hold of a thin thread which, on pulling it,

(Concluded at foot of previous column.)

The Veterinary Record

September 17th, 1938.

Professorial Salaries

SINCE the war much has been done directly and indirectly by the N.V.M.A. and others to raise the status of members of the profession. The position of the veterinarian in the Services of the various Ministries of Agriculture of these islands and in those of municipalities, although not all that many will desire, is undoubtedly far more attractive both financially and otherwise than it was many years ago. Continued efforts are being made to improve the conditions attaching to the Colonial veterinary service.

Recommendations were also placed before the Ministry of Agriculture and Fisheries several months ago upon the position of both research officers and veterinary investigation officers. Over the same period there has been a steady improvement in the emoluments payable to assistants in private practice.

The field where hitherto no concerted attempt has been made by the profession to improve the conditions of its members is that associated with the teaching schools. This is all the more surprising when it is realised that the general improvement in the profession is in part due to the extended period of study necessary to qualify as a veterinary surgeon. Nevertheless some progress has been made in these spheres, particularly at the London College. Staffs are still too limited and the salaries of those below professorial rank are in the main too low, sometimes deplorably so. To some extent hopes are held that the Interdepartmental Committee on Veterinary Education will make recommendations for the improvement of the conditions associated with the labours of this section of the profession, but to rely upon such hopes is not sound policy.

It is regrettable that the finances of the Schools have not in the past allowed their authorities to offer more attractive conditions for the employment of their professorial staffs and one cannot but feel that both these authorities and the N.V.M.A. must share with the Government the blame for the tardiness of the improvements effected. Even now the authorities of some of the Schools appear to lack a true appreciation of the position, and recently an advertisement was received from one of the Schools and was inadvertently published in this journal, inviting applications for a professorship of biology at an absurdly low salary. The minimum salary that can be expected to attract men of professorial rank is £1,000 per annum and if Schools are temporarily unable to offer this salary then they should be satisfied with appointing a lecturer or demonstrator to the post. To attach the title of professor to a post which carries less than half the necessary salary is to oppose the general advancement of status which the profession is slowly but continuously achieving. We sincerely hope that the Governors of our Schools will bear in mind the importance of the ranking and salaries of their staffs to the general well-being of the profession and that such mistakes as that cited above will be avoided in the future.

THE EFFICIENCY OF INTESTINAL ANTISPASMODICS

The following annotation, reproduced from a recent issue of *The Lancet*, will be of interest to our readers on account of the fact that anything which may be learned of the treatment of colic still attracts the attention of the veterinary practitioner.

"The regulation of intestinal motility presents many problems in therapeutics, the solutions of which are not very clearly established; this is particularly true of attempts to reduce spasm and movement. Jackman and Bargen have investigated the action of certain antispasmodic drugs upon the activity of the human bowel and their results encourage the hope that their methods will be used over a wider field. They selected patients with suitable intestinal fistulae and recorded the bowel activity by means of a small balloon introduced through the intestinal opening and connected to a water manometer. They carefully avoided any of the distension of the bowel which air-containing recorders usually produce and took precautions to ensure the comfort, both mental and physical, of their subjects; for these reasons their experimental records have the special merit of the minimum of experimental interference. The action of nitrites was first investigated. The inhalation of amyl nitrite produced a definite but transitory diminution in intestinal tone, and glycerol trinitrate a similar but slightly more prolonged effect. The short duration of the response and the accompanying vascular symptoms, however, diminish the value of these drugs as practical therapeutic weapons. Atropine and the allied synthetic products syntropan and trasentin caused a very definite and prolonged reduction in tone and motility. The two synthetic drugs produced their effects in doses which were quite free from any side actions such as flushing, diminished salivation, or mydriasis; in the case of trasentin its action could easily be removed by the use of pituitrin or prostigmin. From these results these synthetic drugs appear to be well adapted for therapeutic use."

ABSTRACTS

[Occupational Diseases in Veterinary Surgeons.
Thomsen, Axel. (1938.) *Vet. J.* **94.** 4. 140-157.]

The conclusions reached in this interesting survey of the occupational diseases of veterinary surgeons in Denmark are the result of a questionnaire sent by the author to nearly a thousand veterinarians in that country.

Professor Thomsen points out at the outset that he has not included purely traumatic injuries or incidental illnesses such as the common cold in his survey, but has limited his field of observation to infectious diseases, allergic conditions, and pharmacological idiosyncrasies.

Of the veterinarians approached about half of the number either made no reply or reported that they had never suffered from any occupational disease. A positive group of 611 subjects was thus formed and is studied in some detail.

According to the survey ringworm is one of the diseases most frequently encountered, no less than 159 cases being reported. The disease is acquired in nearly all cases from cattle, especially during rectal examination and in obstetrics, the ringworm frequently being localised around the root of the tail. The condition is usually benign but occasionally more severe cases occur and may defy treatment for long periods. Most simple cases respond quickly to repeated applications of iodine, but in the more malignant types bandaging with odylen or mitigal, or exposure to X-rays may be necessary.

Acariasis is of rare occurrence, only ten cases appearing in the record, and all presumably with sarcoptes. Seven veterinarians reported that they had contracted mange from horses, and only one from a dog. The disease yields readily to treatment.

Erysipelas is reported in 43 instances, infection usually being acquired during autopsy on pigs which have died of that disease. Some solution of skin continuity appears to be necessary before infection can occur, but a few cases of accidental inoculation with a needle during the treatment of infected pigs are noted. The disease in man is usually fairly acute and there is a pronounced tendency to spontaneous recovery. Intramuscular injections of swine erysipelas serum (10 to 20 c.c.) have marked curative effect, and local painting with 10 per cent. chromic acid gives excellent results.

Furunculosis appears to be extraordinarily common, no less than 133 veterinarians reporting it. Practically all cases are localised to the arms but there is occasional extension to the hands and body. Infection is usually associated with strong friction and occurs most often during calving cases, rectal examinations, and treatment for metritis and retained placenta. Irritating disinfectants seem to promote the development of the lesion. The condition can be prevented by rubbing well with thick oil before the operation and disinfecting with chloramin solution after it. Furuncle formation can be checked by pure phenol or by iodine but in more advanced cases deep cauterisation may be necessary. Vaccine therapy may be of value. Pustules and carbuncles are regarded as less and more severe forms respectively of furunculosis.

Cellulitis terminating in abscess formation is regarded as the most important occupational disease of Danish veterinary surgeons. Two hundred cases are recorded. The disease occurs under the same conditions as furunculosis but has marked general effects. The application of hot ichthyol gives good results.

Skin tuberculosis is reported in as many as 74 cases. Several of the affected subjects state that they have been infected more than once. The great majority of the cases are of the primary verrucose type, the tuberculous ulcer being of rare occurrence. Infection is usually acquired during meat inspection and is generally by inoculation. Only four cases of infection from contact with a tuberculous placenta are recorded. The lesion is usually localised to the fingers and as a rule is benign under treatment. Most cases to date have been dealt with by carbon-light therapy but radical operation is generally to be preferred. A number of cases have responded to painting with strong Lugol's solution. Radium treatment appears to show promise.

Skin anthrax is reported in 18 cases, and one case of anthrax in the throat and one case of generalisation are noted. The condition is serious but very rarely fatal. The lesion appears within four to eight days after autopsy on an anthrax carcase and is usually located on the forearm or wrist. It is worthy of note that infection can often occur through unbroken skin even after thorough disinfection. Anti-anthrax serum has a specific curative effect as has neosalvarsan, but the malignant pustule often heals very slowly.

True undulant fever is recorded in a few cases, most of them serious and protracted, but the author points out that more than 94 per cent. of veterinarians who have practised for over a year give a serological reaction indicative of a symptom-free infection with Bang's bacillus. Clinical cases of the latter condition appear only in students or young veterinarians, the older members having acquired immunity. It is worthy of note that all students are advised to undergo vaccination with abortus vaccine before engaging in practice; and are warned against removing

placentae and performing obstetrical operations in cattle before such vaccination.

Nine veterinarians report having suffered from equine stomatitis. The disease closely resembles cow-pox. Only five cases of the latter condition are reported and all were benign.

In view of recent events it is of great interest that the author regards it as definitely established that man can be affected with foot-and-mouth disease, and four cases are reported all of which were benign.

Among the other infections five cases of panaritium, three of conjunctivitis, two of infection from strangles abscesses, one of chicken-pox, and one of malignant oedema are reported.

The chief allergic condition discussed is a brucella skin eruption, the lesion being produced by the action of the proteins of the *Br. abortus* after sensitisation by latent infection with that germ. The condition occurs three to twelve hours after the removal of an afterbirth or after obstetrical work and there is usually rapid and spontaneous recovery, but it recurs each time on similar exposure. One hundred and seventy-one cases are recorded, a few of them very severe. Thorough inunction of the arms before operating has been found effective in preventing the condition, but washing in cold water, then soap and warm water, and finally in alcohol or very dilute Lugol's solution is advised in addition. If other measures fail special gloves must be worn. Painting with iodine is effective in the treatment of clinical cases.

The author also discusses another erythematous eruption of the arms of allergic origin which he considers is produced by the action of heterogeneous proteins on macerated skin. In the great majority of these cases the eruption appears in the spring time only ("spring-eruption"). The eruption arises with great rapidity, is accompanied by intense pruritus, and closely resembles an urticaria. Most cases recover spontaneously and very rapidly.

A few cases of accidental inoculation with tuberculin are noted. The reaction varies with the individual, but may be violent on occasion.

Idiosyncrasies to pharmacological products appear to be relatively unimportant. Sixty-three veterinarians reported intolerance to formaldehyde, 30 to lysol, 22 to phenol, 9 to creolin, 13 to iodine, 12 to iodoform, 6 to arsenic, 6 to sublimate, 4 to chloramin, 4 to aloes, 3 to mercury, and 3 to rivanol.

In his conclusions the author considers how the occupational diseases may be avoided. He insists that rubber gloves should be worn at every autopsy, and that otherwise the minimum requirement of precaution in these operations and in obstetrical work is inunction followed by thorough disinfection. Wounds incurred during the performance of veterinary duties should be looked upon as dangerous. Cauterisation with a Paquelin burner, or by diathermy, and excision are regarded as the only certain forms of sterilisation, but immediate and energetic application of iodine is usually effective, although it offers no guarantee.

Directions for skin disinfection are given in detail but the processes seem too involved for general use in practice. Professor Haxthansen points out that disinfectants often attenuate natural skin resistance and hence do more harm than good, and advises the use of neutral soap, and frequent applications of fats.

It would be difficult to praise this article too much. Delightfully written and with the conclusions clearly drawn, it is an advance in its own particular field, whose importance to veterinarians cannot be over-emphasised. While it contains some matter which is original and much which is contrary to accepted opinion and even radical in thought, it would be of undoubted benefit to every veterinary surgeon in practice to read it in its original form. One would be tempted, then, to forecast that there would be many who would agree with the author that the problem of occupational disease in veterinarians should be accorded fitting research at the earliest possible opportunity.

D. D. O.

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[Domestic Animals as Causes of Accidents in Germany, with special reference to Occupational Injuries of Veterinary Surgeons in Prussia. Habernoll, A. (1938.) *Berl. tierärztl. Wschr.* No. 27. 407-410.]

In 1933 a questionnaire was sent to all veterinarians in Prussia, numbering 3,094, inviting records of infectious, parasitic, allergic and traumatic diseases and injuries sustained by them at their work. Nine hundred and seventy-five of them sent positive replies and they are analysed by the author. It should first be mentioned that general mortality statistics for Prussia for 1927 to 1932 showed that 1,369 persons died as a result of injury by animals and that three of them were veterinary surgeons, all of whom had been kicked (presumably by horses).

Habernoll's figures showed that 150 veterinary surgeons had been injured by horses, 46 by cattle, 37 by dogs, nine by pigs, and one each by a cat, silver fox and hippopotamus. Some replies reported injuries by more than one animal. [It appears certain that numerous slight injuries, such as scratches by cats, were not reported at all and that most of those reported were sufficiently serious to cause incapacity for a time.]

The replies are next analysed according to the animal concerned and to the part of the body injured—thus, of the horse cases 23 were (*a*) kicks to the head, 19 to the chest, 16 to the abdomen, nine to the arm, 49 to the leg, and twelve to a part not specified; one was (*b*) a bite to the head, one to the abdomen, nine to the arm and three to a part not specified. There were also eight other cases of injury of varied nature by a horse, a few being very serious and one of them resulting in the loss of an eye which received a flick from a tail.

Of the cattle cases eight were (*a*) kicks to the head, one to the chest, one to the abdomen, six to the arm, seven to the leg and four to a part not specified. Five were (*b*) horn injuries to the head, four to the chest, one to the abdomen, one to the leg and five to a part not specified. Three further cases of injury were due to crushing between two bovines, to a lashing by the tail and to a bite respectively.

All the dog cases were bites inflicted during the treatment of the animals, none occurring from fierce watch dogs. Four cases were bites by rabid dogs and all four veterinary surgeons recovered after prompt Pasteur vaccination.

All the pig cases were bites inflicted during treatment, most being on the hands, though one was a tusk gash of the lower leg.

The fox and the cat cases were both bites and the hippopotamus case one of arm fracture.

Details are given concerning the course of some of the above cases. J. E.

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[**The Use of Anti-gangrene Serum in the Treatment of Suppurative Lymphangitis.** Report. *Bull. Acad. Vet. France.* **11.** 3. 133-134; **II.—Clinical Note on the Use of Polyvalent Anti-gangrene Serum (Pasteur Institute) in the Treatment of a Case of Suppurative Lymphangitis.** Beauvillain. (1938.) *Bull. Acad. vét. France.* **11.** 3. 135-138.]

In the first reference Forgeot makes a report on the observations of Beauvillain regarding the successful use of anti-gangrene serum in the treatment of acute staphylococcal lymphangitis in the horse.

In the second note Beauvillain gives an account of the treatment of a mare with acute suppurative lymphangitis of the near hind limb. Smears made from two abscesses on the mare's leg showed the presence of a staphylococcal infection. The mare was given a subcutaneous injection of 20 c.c. of polyvalent anti-gangrene serum, prepared by the Pasteur Institute, on alternate days, four injections being given in all. Recovery was rapid and ten days after the commencement of treatment the ulcers had cicatrised and about a week later the mare left the hospital completely healed.

The writer attributes the beneficial result to some paraspecific action of the serum. Forgeot, on the other hand, stated that the action of the serum was due not to its anti-gangrene properties but because it consisted of a mixture of equine sera which are often known to contain appreciable quantities of staphylococcus antitoxin.

In the subsequent discussion Lemétayer supported this view, stating that normal equine serum may produce good results due to a specific antitoxin of natural origin. Both he and Forgeot also emphasised the fact that although good results may follow the use of normal serum or anti-gangrene serum they should only be used when anti-staphylococcus serum was not available.

G. D.

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[**Do Strongyle Larvae Wander Through the Lungs of the Horse?** Wetzel, R., and Enigk, K. (1938.) *Archiv wiss. prak. Tierheilk.* **73.** 2. 83-93.]

In an attempt to settle the controversial question of whether or not the larvae of species of *Strongylus* of the horse migrate through the lungs, Wetzel and Enigk have carried out a number of experiments, the details of which are given. They found that larvae of *Strongylus equinus* and *S. vulgaris*, when given *per os* to non-specific hosts such as mice, guinea-pigs and rabbits, for the most part completed the second moult in the small intestine; a small proportion of larvae, however, penetrated the wall of the caecum and colon. Since the subsequent behaviour of the larvae differed in the individual kinds of experimental animals used, the authors consider it impossible to formulate on such evidence any rule about the behaviour of larvae in equines. In one oesophagotomised and five tracheotomised horses and asses, to which the larvae of *S. equinus*, *S. edentatus* or *S. vulgaris* had been given, no strongyle larvae were demonstrated in the trachea or oesophagus up to 98 days after the infestation. From this evidence the authors argus that strongyle larvae do not migrate in equines *via* liver, posterior vena cava and lymph glands, ductus thoracicus, right heart, lungs, trachea and throat, while further experimental infections of nine equines produced no points to support the possibility of a migration by the larvae *via* the greater blood circulation.

J. N. O.

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[**Treatment for Severed Flexor Tendons in a Horse.** Wolter, H. (1938.) *Deuts. tierärztl. Wschr.* **46.** 25. 390-391.]

A farm horse in shying kicked against a straw-cutting blade and completely severed the superficial and deep flexor tendons in the

middle of the off hind cannon bone. The author tried a novel method of treatment with the object of avoiding knuckling of the fetlock due to tendon contraction which is liable to follow attempts at rapid healing by early suture and artificial support to the fetlock. Chronologically the treatment was as follows (figures in weeks after the accident): one week rest in stable then tendon suture cross-wise, the proximal superficial stump to the distal deep stump and conversely—the idea being to obtain a more elastic union. At one-and-a-half weeks a heavy block wood "shoe" applied, 12 cm. thick, 22 cm. wide and projecting behind the heel 15 cm.) the hoof being placed in a cavity in the block and there secured by a leather strap. At five-and-a-half weeks the block was replaced by an iron shoe with heel extensions reaching 10 cm. behind the heels of the hoof, the ends provided with 5 cm. high calkins and an iron plate being fixed underneath between the bars to prevent the calkins sinking into soft ground. At eight-and-a-half weeks the horse was transferred from stable to pasture and at 17 weeks it was practically sound.

J. E.

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[**Tuberculin Pachydermia in a Horse.** Potel (1938.) *Tierärztl. Rdsch.* Jan., 1938. 37-40.]

After commenting on the relative rarity of tuberculosis of the skin of domestic animals as compared to that of man, the author describes two cases of widespread infection of the skin of the horse.

The first case was that of a five-year-old which showed multiple large swellings of the skin, gave a positive reaction to the tuberculin test and had an enlarged spleen and mesenteric lymphatic glands. The second case was a seven-year-old which showed multiple abscesses but at *post-mortem* examination no other lesions were revealed.

The histological changes in the skin of these two horses are described in detail. The normal skin structure was replaced by an extensive fibrous tissue stroma in the midst of which there was a "miliary" type of tubercle lesion. All evidence went to show that the tubercle bacillus was the essential and primary cause of the condition. [The foregoing facts are worth remembering in connection with the differential diagnosis of conditions such as glanders, epizoötic lymphangitis, ulcerative lymphangitis, sporotrichosis, etc. Actually in the above cases there was no suggestion of a localised distribution along the lymphatic vessels, nor was ulceration noted. Nevertheless, it is possible that cases of tuberculosis might occur in which the differentiation of this cutaneous type from varieties of farcy might present some difficulty.]

E. J. P.

N.V.M.A. DIVISIONAL REPORTS

Dumfries and Galloway V.M.A.*

MEETING AT CARLISLE

A meeting of the above Division was held in the Crown and Mitre Hotel, Carlisle, on July 26th, 1938, at 12 noon. The chair was occupied by the President, Mr. John Cameron, Carlisle, and the following other members were present: Messrs. John Allan, R. Craig Robinson, F. A. Gordon, A. J. Kennedy, A. J. Milligan, W. L. Mackenzie, A. Young and G. A. Sangster, Hon. Secretary, together with Messrs. N. W. Keith and A. Young, Junr., visitors.

Apologies for absence were received from Messrs. P. McKinlay, W. Watt, J. M. T. McCrorie, W. T. Hewetson, W. G. Robinson and T. B. Fleming.

The President read the minutes of the previous meeting which were approved.

Obituary.—Mr. Craig Robinson said that it was with deep regret that he reminded the members of the death of a much respected member and former President of the Society, *viz*, Mr. Scott, of Penrith. Mr. Scott all through a trying illness, involving much suffering, remained most bright and cheerful as his colleagues were wont to see him. The President concurred and the Secretary was asked to convey the deep sympathy of all the members of the Society to Mrs. Scott and family. The meeting stood in silence in Mr. Scott's memory.

Correspondence.—(1) From Mr. R. Simpson thanking the members of the Society for past support and expressing a desire to be relieved of the duties of representing the Division on the Council of the National Veterinary Medical Association. The Secretary was asked to convey the thanks of the meeting to Mr. Simpson for past services and help.

It was decided that the President, *ex officio*, should with the Hon. Secretary represent the Division on the Council of the N.V.M.A.

(2) From Mr. John Reid tendering his resignation as a member of the Society owing to his having left the district. This resignation was accepted.

(3) From the General Secretary of the N.V.M.A. regarding the Report of the Poultry Technical Committee, recommending that each Division should organise a short refresher course in Poultry Husbandry and Disease Control. It was decided to hold a special meeting early in October and have at this meeting a lecture and demonstration on one or

*Received for publication August 26th, 1938.

more of the poultry diseases, and, if it was considered necessary, to follow on with more such lectures.

Membership.—The following gentlemen were elected members of the Division: Messrs. F. A. Gordon, I. G. McMillan and J. Barr. Mr. N. W. Keith was proposed by Mr. Cameron and seconded by Mr. Gordon.

Afternoon Tour.—The members were joined at lunch by the ladies and visitors and later in the afternoon they went for a short tour of the Lake District. A halt was made to admire the grandeur of the Aira Force waterfall. Leaving Ullswater the party returned to Tirril where they were entertained to tea by Mr. and Mrs. Cameron amidst the charming surroundings of an old world English hostelry. On the call of Mr. KENNEDY, Mr. and Mrs. Cameron were thanked for their hospitality and all agreed they had spent a very delightful afternoon.

G. A. SANGSTER, *Hon. Secretary.*

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Western Counties V.M.A.*

MEETING AT LAUNCESTON

A meeting of the above Division was held at the White Hart Hotel, Launceston, on Wednesday, June 15th, at 2 p.m. The President, Captain J. K. Irvine occupied the Chair and the following members signed the attendance book: Messrs. Irvine, R. B. Nelder, D. Hoddinott, P. Fisher, A. Mather, T. H. Irwin, W. Ascott, G. Atkinson, C. V. Wakins, R. G. Saunders, G. Gibbings, C. R. Parsons, W. L. Richardson, H. Fraser, W. G. Blackwell, H. Macdonald, P. W. Bloye, H. W. Townson, C. C. Parsons, C. Masson, and S. J. Motton.

Apologies for absence were received from Sir F. Hobday, Major G. W. Dunkin and Messrs. R. H. Smythe, A. R. Smythe, A. G. Saunders, E. R. Edwards, G. Roberts, W. H. Chase, C. Crowhurst, E. C. Bovett, F. T. Harvey, G. Harvey, C. Stephens, L. E. Perkins, A. S. Head and C. Head.

Confirmation of the minutes of the previous meeting was postponed until the Autumn Meeting.

Membership.—Mr. G. E. Clarke, M.R.C.V.S., of Ilfracombe, was unanimously elected a member of the Division and the nomination was made of Mr. G. Tullis, M.R.C.V.S., D.V.S.M. (proposed by Mr. L. E. Perkins; seconded by Hon. Secretary).

Fees for Tuberculin Testing.—Fees in connection with tuberculin testing were discussed and it was decided that in herds which were being tested in connection with the Assisted Test Scheme of the Ministry of Agriculture, or where an owner was testing his herd to see if it would be worth his while to consider attempting to have his herd registered in one of the tested grades, the minimum fee should be a flat rate of £1 11s. 6d., plus 2s. 6d. per head, and travelling allowance at the rate of 4d. per mile each way.

Poultry: Refresher Courses.—The question of refresher courses in connection with the diseases of poultry and poultry husbandry was discussed and the Secretary was instructed to send out a circular memo to members.

Specimens.—Specimens of lesions of fowl paralysis were exhibited by Mr. C. V. Watkins.

Next Meeting.—It was decided to hold the autumn meeting at Taunton.

Address.—Mr. R. Glave Saunders, of Exeter, gave an address on "The Problem of Cruelty to Animals." [The text of Mr. Saunders' address and a report of the discussion which followed are reproduced earlier in this issue of the *Record.*—EDITOR.]

The meeting concluded with a vote of thanks to Mr. Saunders for his address and to the President for conducting the meeting.

S. J. MOTTON, *Hon. Secretary.*

* Received for publication, July 27th, 1938.

SUCCESSFUL VACCINATION WITH DEAD TUBERCLE BACILLI

The *British Medical Journal* reports in a recent issue that some unusually successful results from vaccinating guinea-pigs with dead tubercle bacilli have been obtained by G. Hensel.* "Twenty-one animals were inoculated, presumably subcutaneously, with 0·005 gramme of tubercle bacilli suspended in 1 c.cm. of lanolin or soft paraffin. The organisms had been killed by exposure for two hours to a temperature of 65° C. Ten to eighteen months later, when still tuberculin-positive, the animals were injected intracutaneously into the hind leg with 0·00001 mg. of living tubercle bacilli from a four-weeks-old culture. Ten control animals received the same infecting dose simultaneously. Cultures put up from the inoculum showed that living tubercle bacilli were present. Three months later all the animals were killed. In the control group the focal glands were enlarged and partly caseous, and in nine out of ten animals the spleen was obviously tuberculous. In the vaccinated group, with one exception, not a single animal showed any lesions in either the glands or the spleen. Examination of the vaccination site showed the presence of a capsulated lesion containing apparently unaltered vaccine material with intact acid-fast bacilli. Only in the animal showing tuberculosis had the lesion developed into an abscess and discharged part of the vaccine material. The reasons for the extraordinarily successful result of this experiment are discussed. The author lays stress on the long period of allergy—ten to eighteen months—elapsing before infection, on the smallness of the infecting dose used, and on the choice of the intracutaneous route for infection, which ensured that the living bacilli gained access to the tissues slowly."

* *Beitr. klin. Tuberk.*, 1938, **91**, 442.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Sept. 19th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 4 p.m.

Sept. 20th.—Applications due for Miss Aleen Cust Veterinary Research Scholarship.

Sept. 23rd.—General Meeting of the North of England Division, N.V.M.A., at Catterick Bridge, Yorks, 5.15 p.m., preceded by programme commencing at 1.45 p.m. (see announcement).

Sept. 30th.—Annual Dinner of R.A.V.C. Old Comrades' Association, at Anderton's Hotel, London, E.C.4, at 7.30 p.m.

Oct. 5th.—R.C.V.S. Committee Meetings.

Oct. 6th.—R.C.V.S. Committee Meetings.

Oct. 6th.—Annual General Meeting of the Central Veterinary Society, Conway Hall, W.C.1, 6.30 p.m.

Oct. 7th.—R.C.V.S. Committee and Council Meetings.

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THE GLASGOW CONGRESS

(*Continued from page* 1201.)

In our issue of October 1st we shall recount in full the proceedings of the outstandingly successful N.V.M.A. Congress of 1938. Scotland has an admirable record in respect of such meetings, and by that which closed at Glasgow on Friday of last week the high standard set at other conference centres north of the Border in the past was worthily maintained. Further general impressions of a great event must be withheld for our special number; for the purpose of these notes we take up the threads of the account where we had perforce to drop them last week to meet printers' requirements—a circumstance which suspended the story at the annual general meeting on the Wednesday.

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The proceedings at the banquet on the evening of that day provided the first of the eagerly awaited opportunities for the members of the Association, whose sentiments on this occasion were admirably voiced by Mr. McIntosh, to pay tribute to the President for his magnificent leadership during a year of immense significance in the history of the "National" and of the profession as a whole. The banquet, the Congress and with all the momentous activities of the Association during the period of Mr. Campbell's presidency have borne the stamp of his personality, and it is small wonder that those whom he has led, steadied and inspired throughout a supremely difficult time, were anxious to acclaim the man who has succeeded in turning forces and circumstances potent for disintegration into media for uniting the profession and enabling him to leave the Association stronger and more hopeful than he found it on his accession to the Chair.

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As one Congress succeeds another in, we hope, endless succession, memories of even their most pleasing features are apt to fade, but that of the excursion of 1938 is sure to remain ineffaceable. The whole-day steamer trip down the Clyde, with its busy yards—past the mammoth hull of the Queen Elizabeth, rapidly approaching completion—then amongst the glorious islands of the Firth, enjoyed as it was in perfect weather, combined so much of interest and loveliness that even the most sophisticated travellers participating must long to repeat the experience. For once it was not a tired party, but one refreshed in body, mind and spirit that landed in good time for the wholly successful Ladies' Guild Dance in aid of the benevolent funds of the profession, which fittingly "rounded off" a day of sheer delight.

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The whole meeting was a triumph of organisation and the Provisional Committee, as they deserved, "had all the luck," not only at the hands of the Clerk of the Weather on the Thursday, but of those of the clock on the following day, when the discussion of three short papers was safely completed in time for the closing meeting shortly after midday. On the induction of Mayor DeVine it was made abundantly clear to the incoming president that while Mr. Campbell furnished an outstanding example of the "difficult man to follow," the members of the Association had every confidence in his ability to do so. Never were votes of thanks—the customary list being augmented by a tribute to the authorities of the Empire Exhibition, which had proved such an asset to the "social side"—more heartily accorded or more richly deserved, and after brief routine business the new President declared the Congress closed.

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PERSONAL

Forthcoming Marriage.—Abbott—Wylie. The engagement is announced between Alan V. R. G. Abbott, M.R.C.V.S., only son of the Rev. and Mrs. H. Alldridge Abbott of Plamers School, Grays, and Betty, elder daughter of Mr. Arthur M. Wylie, M.R.C.V.S., and Mrs. Wylie, of The Dell, Grays.

Appointment.—Professor R. G. Linton, PH.D., M.R.C.V.S., who officiated as deputy principal of the Royal (Dick) Veterinary College, Edinburgh, during the vacancy following upon the death of Dr. O. Charnock Bradley, has been appointed vice-principal. When the College opens its 116th session in October, a welcome will be extended to the new principal, Colonel Sir Arthur Olver.

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Colonial Veterinary Service.—The following promotions in the Colonial Veterinary Service are announced:—

BEATON, W. G. (Veterinary Research Officer), Senior Veterinary Officer, Nigeria.

CLARKE, N. (Veterinary Officer), Senior Veterinary Officer, Nigeria.

DUNWOODY, R. (Veterinary Officer), Senior Veterinary Officer, Nigeria.

Following is the list of veterinary officers in the Colonial Veterinary Service who arrived home on leave during August: Messrs. H. Cronly and A. W. Gledhill (Uganda), W. C. L. Orr (Gold Coast) and R. A. B. Stanhope (Federated Malay States).

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R.C.V.S. OBITUARY

SHARPE, Granville Cecil Hooper, *M.C.*, Chief Veterinary Surgeon, Salisbury, Southern Rhodesia, Major, B.S.A. Police. Graduated London, July 20th, 1906. Died August 27th, 1938.

MAJOR HOOPER SHARPE

Major G. C. Hooper Sharpe, who passed away suddenly at Salisbury on August 27th, had occupied the post of Chief Veterinary Surgeon of Southern Rhodesia since 1933 and Chief Veterinary Officer of the British South African Police. During the Great War Major Hooper Sharpe served in East Africa and was awarded the M.C. He was a keen member of the Mashonaland Turf Club.

Major Hooper Sharpe was buried at Salisbury with full military honours.

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GENERAL OBITUARY

MR. CHARLES CRUFT

The death on Saturday last of Mr. Charles Cruft, the founder and organiser of Cruft's Dog Show, the greatest annual event of its kind in the world, removes one who, in his early association with James Spratt, of Holborn, founder of the big firm that now bears his name, laid well the foundations of his later fame by encouraging the establishment of canine societies, recognising that the increase of pedigree dogs would lead to better feeding.

When in 1886 it was thought there was room for another show in London he was approached, and on March 10th of that year his first effort was made at the old Royal Aquarium, in Westminster. This was described in the catalogue as "The first Great Show of all kinds of Terriers." Among his patrons were General Lord Alfred Paget and Major-General Raines. He received 570 entries.

In 1890 collies and several breeds of toys were added to the programme, and a move was made to the Central Hall, in Holborn. The following year the show was thrown open to all breeds, the Royal Agricultural Hall being selected as the venue, and there Cruft remained. The show obtained such a reputation that Queen Victoria exhibited there occasionally; King Edward VII and Queen Alexandra, before they came to the throne, were frequent exhibitors. In 1893 the then Tsar of Russia sent over a team of 18 borzois to compete, and King George V showed his first Labrador terrier there in 1916, afterwards entering with fair regularity. Queen Alexandra attended the show in 1910 and again in 1914. By 1914 the show had attained a magnitude that made it the foremost in the world, but the entries obtained then were insignificant compared with those of later years. Cruft's Golden Jubilee Show a few years ago received well over 10,000 entries, and that figure has been closely approached on several occasions.

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H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses: London: Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1: Cardiff: 1, St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120, George Street.

	Price net s.	d.	*Post free* s.	d.
DRAFT STATUTORY RULES AND ORDERS, 1938:				
Poisons List (Amendment) Order, 1938	0	1	0	1½
Poisons (Amendment) Rules, 1938	0	2	0	2½
SCIENTIFIC AND INDUSTRIAL RESEARCH, DEPARTMENT of: Food Investigation Board Annual Report for 1937 (47-7-0-37)	4	0	4	5

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DRAFT POISONS LIST (AMENDMENT) ORDER, 1938, AND RULES

The Draft Poisons List (Amendment) Order, 1938, provides for the inclusion in Part I of the Poisons List of benzedrine and sulphanilamide, together with related substances. The Order is to come into operation on January 1st, 193[illegible] after which date these substances may only be supplied to members of the public through chemists. Under sulphanilamide and its derivatives the following will be included:—

COLSULANYDE
P.A.B.S.
PRONTOSIL ALBUM (PRONTYLIN)
STREPTOCIDE
SULPHONAMIDE-P
SULPHONAMIDE EMULSION
PRONTOSIL SOLUBLE
PRONTOSIL RUBRUM (SEPTOSON)
PROSEPTASINE (M. and B. 125)
RUBIAZOL
SOLUSEPTASINE
M. and B. 693

All the substances mentioned above will become First Schedule poisons under Rule 5 of the Draft Poisons (Amendment) Rules referred to below. In addition, under the Draft Rules, sulphanilamide and related substances are added to the Fourth Schedule, and therefore may be supplied only upon prescription.

The Draft Rules amend the Poisons Rules, 1935, and come into operation on January 1st, 1939. The following is an explanation of their provisions, published in the *Pharmaceutical Journal* of September 10th.

Rule 1.—It is made unnecessary for a signed order for a First Schedule poison (other than a Dangerous Drug) from a duly qualified medical practitioner, registered dentist or registered veterinary surgeon or hospital to bear the statement of the purpose for which the poison is required.

Rule 2.—Rule 17 of the Poisons Rules, 1935, is amended to permit the following methods of naming poisons which previously were not in order:—

(1) When a poison is named specifically in the Poisons List (*e.g.*, amyl nitrite, chloral hydrate or chloroform) and is included in the B.P. or B.P.C., one of the names at the head of the monograph in the B.P. or B.P.C. respectively may be used instead of the term in the Poisons List.
(2) The mode of naming preparations included in the B.P. or B.P.C. has been extended to substances which are not preparations, such as crude drugs.
(3) When the proportion of a poison is expressed in the manner provided by the Sixth Schedule to the Poisons Rules, the name of the poison or substance mentioned in the second column of the Sixth Schedule is sufficient as the name of the poison.
(4) In expressing the name and proportion of the poison, preparations of opium or nux vomica need bear only the name and proportion of morphine or strychnine respectively.

Rule 3.—Minor amendments are made in Rule 18 to bring the mode of expressing the proportion of a poison into line with the new methods which are permitted in naming a poison.

Rule 4.—Express provision is made so that local anaesthetics for injection in the treatment of human ailments need not be supplied in fluted bottles.

Rule 5.—The effect of this Rule is to include in the First Schedule all substances made poisons under the Draft Poisons List (Amendment) Order, 1938 (benzedrine and sulphanilamide and their derivatives, etc.).

Rule 6.—The Third Schedule to the 1935 Rules is amended to contain dinitrocresols in any form except preparations for the treatment of human ailments and benzedrine in appliances for inhalation, in which the poison is absorbed in inert solid material. Substances included in this Schedule are exempt from all control under the Pharmacy and Poisons Act, 1933, and the Poisons Rules, 1935.

Rule 7.—Sulphanilamide and related substances are added to the Fourth Schedule, and so can be supplied only upon prescription.

Rule 8.—The forms in which listed sellers may sell nitrobenzene have been extended to include ointments for the treatment of animals. Metallic oxalates other than potassium quadroxalate may be sold by listed sellers as photographic materials and not only as formerly in photographic solutions.

Rule 9.—Benzedrine is added to the Seventh Schedule and must be labelled "Caution. It is dangerous to take this preparation except under medical supervision."

Rule 10.—Insulin, nux vomica and opium are added to the Sixth Schedule and provision made so that the proportion of insulin in a preparation may be expressed in terms of units of activity as defined in the British Pharmacopoeia and admixtures of nux nomica or opium need bear only a statement of the proportion of strychnine or morphine respectively.

Rule 11.—The amendments are to come into operation on January 1st, 1939.

"The inclusion of benzedrine and sulphonamide compounds in the Poisons List and in the First Schedule to the Poisons Rules will not surprise our readers," proceeds the *Journal*. "The suggestion that sales of these substances should be restricted was made to the Poisons Board many months ago, and a large amount of publicity has subsequently been given in the daily Press to the desirability of controlling sales of the former drug. Both of these substances have received a good deal of attention by the Council on Pharmacy and Chemistry of the American Medical Association, who have recommended their use only on the instructions of medical practitioners. Of the two compounds, benzedrine has undoubtedly been subjected to greater abuse, especially by students "cramming" for examinations, who have turned to it for its property of enabling them to work harder without developing the normal feelings of lassitude and tiredness.

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ARMY VETERINARY SERVICE

London Gazette—War Office—Regular Army

Sept. 9th.—Capt. D. I. C. Tennant is secd. on appt. to the Ind. Continuous Serv. Cadre (August 10th).

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INCREASING POPULARITY OF MILK

It is particularly encouraging to note, the annual report of the Milk Publicity Council states, that by the milk-in-industry scheme more liquid milk is being consumed, while there is no adverse effect, as far as can be ascertained, on ordinary retail sales. There are now 7,240 factories which employ more than 2,218,506 workpeople participating in the milk-in-industry scheme; the consumption is at the rate of 8,500,000 gallons a year, having nearly doubled in 12 months.

Comments made by welfare workers and medical officers show, it is stated, that with the inauguration of the scheme better health is being experienced by those workers who take milk daily. There has also been much less loss of work through absenteeism. The scheme followed the introduction of the milk-in-schools scheme, which the Council regard as "a piece of good constructive work which has been a benefit to the nation as a whole." Today nearly 3,000,000 children are receiving milk under the subsidised scheme. Efforts have also been made to extend it to school holidays so that the children may have the benefit of milk out of term time. This is particularly desirable, it is urged, as a further report has recently been published by the Milk Nutrition Committee of the Ministry of Health proving the nutritional value of milk.

Over 1,000 milk bars have now been established, though the first appearance of one was at the Bath and West Show at Taunton in 1935. The Council's staff have given during the year 10,745 lectures and demonstrations to audiences totalling 612,361, and there were 1,310 film showings to 126,453 people.

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CHEMICAL ASPECTS OF ANTIGENS AND ANTIBODIES

We read in a recent issue of the *British Medical Journal* that in order to record the rapid advances that have been made in the field of immunochemistry the Medical Research Council has issued a revised edition of Professor Marrack's report on the chemistry of antigens and antibodies.* "That a second edition should be called for within such a short space of time speaks much for the usefulness of this concise and lucid account of the chemistry of antigens and antibodies and for the success that has been achieved in explaining certain immunity

**The Chemistry of Antigens and Antibodies.* By J. R. Marrack, Medical Research Council Special Report No. 230. H.M. Stationery Office, 1938. (3s. net.)

reactions in terms of the fundamental sciences. The division of the report into five chapters has been retained, but the new edition has been extensively revised. An account of the work of Svedberg and his school on the determination of the molecular weights of different proteins has been included, together with a fuller survey of the bacterial polysaccharides and a critical discussion on the relationship that has been shown to exist between chemical constitution and immunological specificity. A more detailed explanation of serological cross-reactions in terms of chemical and physical structure and the important work of Heidelberger and Kendall are treated at some length by Professor Marrack and add much to the value of the report. Within the last few years Heidelberger and Kendall have considerably advanced our knowledge of antigen-antibody reaction by developing a theoretical treatment of the combination which appears to be in general agreement with the results of a large number of carefully planned quantitative experiments. It is unfortunate that Professor Marrack did not include in the new edition an account of the recent work on the nature of bacterial antigens. This work has developed rapidly during the last five years, and to-day it seems an established fact that the specific antigens of certain of the Gram-negative organisms at least are non-protein in nature. Until recently it seemed probable that bacterial antigens were composed of a polysaccharide substance, with which the immunological specificity of the antigens was closely associated, combined with bacterial protein which endowed the complex with antigenic properties. The demonstration of the non-protein nature of some bacterial antigens again brings forward the question why certain complexes should possess antigenic properties. Large molecular size appears to be an essential characteristic of antigenic molecules, but not all large molecular complexes are antigenic. It seems probable that a detailed study of the chemical and physical properties of these protein-free antigens will contribute a good deal towards our understanding of the properties essential for antigenicity. Workers in the field of immunochemistry and others interested in this subject are much indebted to Professor Marrack for preparing for them this reliable and up-to-date account of the chemical aspects of immunity reactions."

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STRUCTURE OF PEPSIN

"The cyclol structure C_2 containing 288 amino-acid residues is proposed for the molecule of pepsin by D. M. Wrinch (*Phil. Mag.* 24. 940. 1937). In this structure the mid-points between adjacent atoms lie on the faces of a truncated tetrahedron which would account for the globular form of the molecule and the molecular weight of 39,200. The dimensions of unit cell in the crystal lattice, as determined by X-ray investigations, are $a=67$ A., $c=462$ A. Taking the density as 1·32, this gives a cell molecular weight of 1,434,000. Since half the weight of the crystals is made up of water removable at room temperature, then the number of molecules per unit cell must be $1,434,000/(2\times39,200)=18·3$. X-ray evidence has also suggested that the unit cell is a nine-layer structure, hence there must be two molecules to each layer, each of which is associated with (say) 2,350 water molecules. From the dimensions of the crystal cell, the size of the cyclol C_2 molecule and the possible arrangement of the 18 molecules in a nine-layer system in the cell, it is deduced that the molecules must lie some distance apart, the distance between parallel faces of adjacent molecules being sufficiently great to suggest co-ordination through the R groups of the molecules. Co-ordination of carboxyl groups (from the glutamic acid residues) with water molecules as intermediaries and of amide groups (from glutamine residues) are both suggested as possible. The great mass of the water molecules associated with the pepsin molecules in the crystal may form mega clusters between the layers of pepsin molecules resulting in a crystalline arrangement of atoms throughout the lattice. The presence of such clusters and of water molecules in the co-ordination bridges would imply a collapse of the structure if the water were withdrawn and would fit with the well-known fact that pepsin crystals lose their stability on drying."—*Nature*, July 30th, 1938.

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NEED FOR TESTING AND STANDARDISATION OF DRUGS IN VETERINARY USE IN SOUTH AFRICA

Lieut.-Colonel J. Wakefield Rainey, C.B.E., M.R.C.V.S., in the course of a contribution to the *Farmers' Weekly*, of South Africa, after paying a tribute to the efficiency of the Union's Veterinary Service, says that a State Veterinary Service, because of the prior call on the time and energy of its personnel for bacteriological work and sanitary routine, cannot attend largely to general practice; and diagnosis and treatment by means of correspondence are not always satisfactory.

"In the more closely-settled countries of Europe, this gap in veterinary service to the community is filled by the private practitioner, but here, obviously, the distances are too great and the cost is too high for farmers to be able to depend on such assistance. The Veterinary Division of the Union Department of Agriculture could enhance its already high prestige and do further great service to the primary producer by taking steps to standardise and rationalise advice on drugs and methods of treatment for sick animals.

"As things are at present the farmer is getting differing advice on these matters from varying sources, professional, journalistic and quack. Not much of this long-distance direction is really helpful, much is wholly useless, some is dangerous and the sum is confusing. The Veterinary Division could create an honourable and overdue precedent, in a civil service, by forming at once a branch to be engaged permanently on the scientific testing and standardisation of drugs and methods of treatment used for the common ailments of farm animals. This is not a fanciful or impracticable suggestion because it is based on what was to a large extent done and observed by the writer in the British military veterinary work of the Great War, whereby a vast amount of definite information of the uselessness of orthodox drug treatment was obtained.

"The first experiments should be made with the older drugs and clinical methods, because it is a paradoxical fact that, whereas tradition is taken as good authority for the use of an old drug or method, a new one is always—quite properly—subjected to systematic tests before receiving academic approval. It is a relatively easy matter to test the curative or prophylactic value of any drug by the modern method of taking a sufficient series of cases of the disease and treating one case with the drug and leaving the other untreated, alternately, until an indisputable conclusion can be reached."

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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THE ZURICH CONGRESS

To the Editor of the Veterinary Record

Sir,—Having recently attended the 13th International Veterinary Congress at Zurich, I would like to point out that the proceedings were quite spoilt for most of the English-speaking members present owing to interpreters not having been provided. I was at the International Dairy Conference in Berlin last year and the arrangements there for translating German and French into English or *vice versa* were excellent. Surely some blame must rest on the members of the Permanent Committee representing Great Britain for not having arranged some time ahead to have engaged at least three good interpreters. Unfortunately, Dr. du Toit, as a linguist, is in a class by himself and there was no English veterinary surgeon at the Conference who had his facility for translating languages.

Yours faithfully,
Graham Rees-Mogg.

Hotel Waldhaus
Vulpera, Tarasp.
September 2nd, 1938.

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CASTRATION BY BURDIZZO FORCEPS

To the Editor of the Veterinary Record

Sir,—With regard to Lt.-Col. O'Rorke's letter in your issue of the August 6th, considerable experience of the sterilisation of adult horses by means of the "Burdizzo" has been obtained in this country and the success of the method is unqualified, in my opinion.

The subjects have been race-horses and polo ponies, usually from five to eight y.o. The effect is not obtained until three to six months after operation.

There is usually considerable swelling of the scrotum in from 48 to 72 hours, accompanied by some pain but latterly these have been very much minimised by administering a good laxative just before operation and by gentle walking exercise night and morning commencing on the day after operation. Such animals are fit for light work in from two to three weeks.

As the end result is the same as in castration there would appear to be no objection to the use of the term "gelding" for such an animal.

Yours faithfully,
W. G. Beaton,
Senior Veterinary Officer.

Veterinary Department,
Vom,
Northern Nigeria.
August 29th, 1938.

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To the Editor of the Veterinary Record

Sir,—I notice that Lieut.-Col. F. C. O'Rorke in the August 6th issue of the *Record* seeks information from any reader who has had experience of the Burdizzo forceps as applied to mature horses and ponies.

Some years ago I was tempted to use this method of emasculation in Adamawa Province of Nigeria. The reason for adopting the Burdizzo method was to encourage the Moslem horse owners to have stallions which were useless for breeding purposes rendered sterile. As the Province was large such work would have to be delegated to trained native veterinary assistants and it was thought if the Burdizzo forceps was a success it would be ideal as it is in constant use amongst goat herds for the castration of unsuitable "billies."

My observations were as follows:—

(1) The operation is not as satisfactory as ordinary castration. In mature horses it is necessary to crush each cord separately. There is considerable risk that the short cord of the horse will slip out of the forceps or never be included. The skin of the scrotum is thin and the forceps leaves a wound behind which is, in a tropical country, almost certain to become septic.

(2) There is very considerable swelling of the testicle accompanied by great pain. Severe oedema of the sheath and abdomen have been noticed.

(3) After-treatment of (2) is protracted and I should say that a "Burdizzoed" horse would not be fit for light work under six to eight weeks.

After an experiment with a few horses I discontinued the method as unsatisfactory and as being, in my opinion, objectionable from the humane standpoint. I might say that this has also been my experience with aged cattle.

Yours faithfully,
R. W. Sainsbury.

Nigerian Veterinary Service,
Zaria.
September 6th, 1938.

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To the Editor of the Veterinary Record

Sir,—In August 6th issue of the *Veterinary Record* Col. O'Rorke asks a number of questions about castration of mature ponies by Burdizzo forceps. Although I have operated on only about twenty ponies, aged between five and twelve years, using the Burdizzo, my experience in answering his questions may be useful.

(1) The operation is not as satisfactory as ordinary castration.

(2 and 3)—A large and very painful swelling begins about the second or third day after the operation. By about the eighth day slight wrinkling is noticed; by about the 10th day the pony experiences less pain on walking. Nearly three weeks elapse before he is fit for light work. Some years ago I described in the *Record* a case in which a necrosed testicle dropped out of the scrotum following abrasion by the hairs of the tail on the dependent part of the swollen skin.

Yours faithfully,
B. Best.

Bauchi,
Nigeria.
September 5th, 1938.

Advertiser's Announcement

Messrs. T. J. Smith and Nephew, Ltd., Neptune Street, Hull, will be pleased to send any reader of the *Veterinary Record* a copy of their latest publication, entitled "Elastoplast and Cellona Technique in Veterinary Practice." All methods of treatment described are based on actual clinical reports which they have received from the field.